

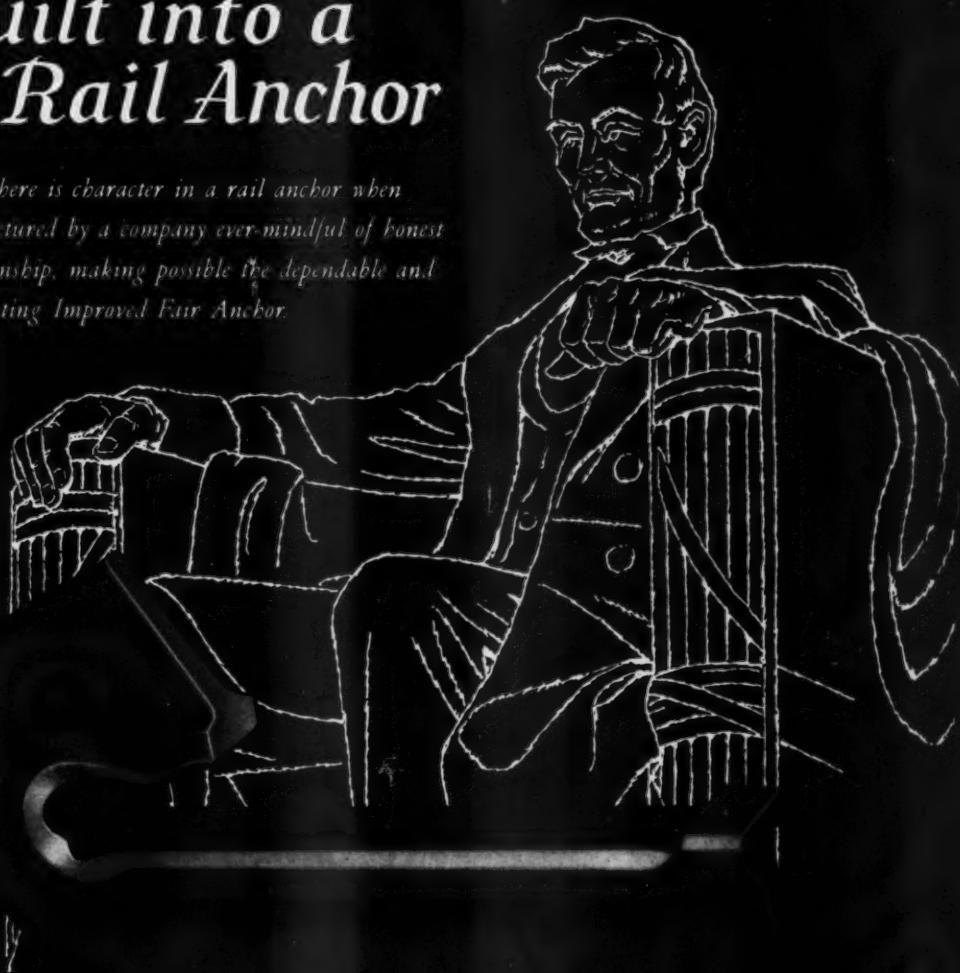
July 1957

RAILWAY

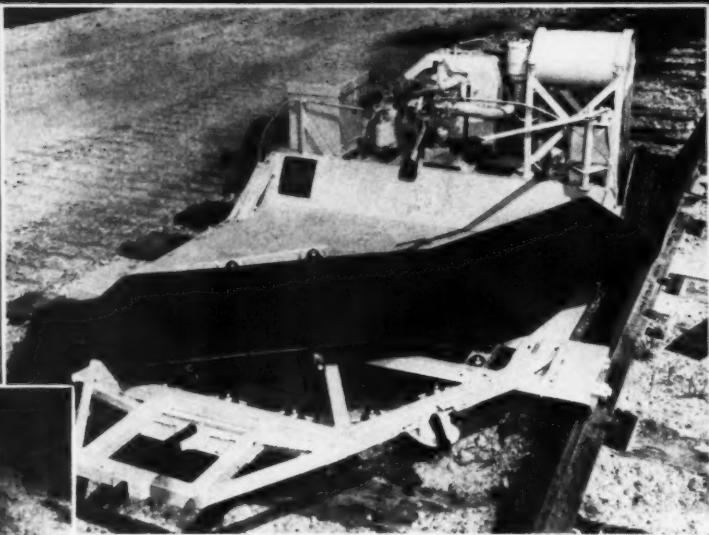
# TRACK and STRUCTURES

## CHARACTER *Built into a Rail Anchor*

*There is character in a rail anchor when manufactured by a company ever-mindful of honest workmanship, making possible the dependable and long lasting Improved Fair Anchor.*



**NOW!**



Foreman in Sighting Position



Foreman in Travel Position

The Complete Line of Kershaw Track Maintenance Equipment

Ballast Regulator, Scarifier and Plow Attachments ★  
Single Wheel-Type Kribber ★ Mocar Crane ★  
Cribber-Adzer ★ Jack-All ★ Track Crane ★ Tie Bed  
Cleaner ★ Track Broom ★ Track Skeletonizer and  
Undercutter ★ Ballast Cleaner and Distributor ★ Spot  
Tamper ★ Two-Wheel Kribber ★ Chemical Spreader  
Car ★ Deadhead Detector ★ Rail Re-Layer.

*Now ... more than ever ...  
Recognize This Symbol of Leadership...*

## The NEW Kershaw FOREMAN'S SIGHT CAR!

Get quicker, more accurate sighting during track reconditioning operations with the Kershaw Foreman's Sight Car.

This handy, self-propelled car cuts fatigue by allowing foremen to remain in prone position for hours at a time during the sighting job. The comfortable, reclining position enables foremen to do a better, more accurate job. The self-propelled feature of the Kershaw Foreman's Sight Car produces speed by moving foremen from rail to rail at a minimum of time and effort.

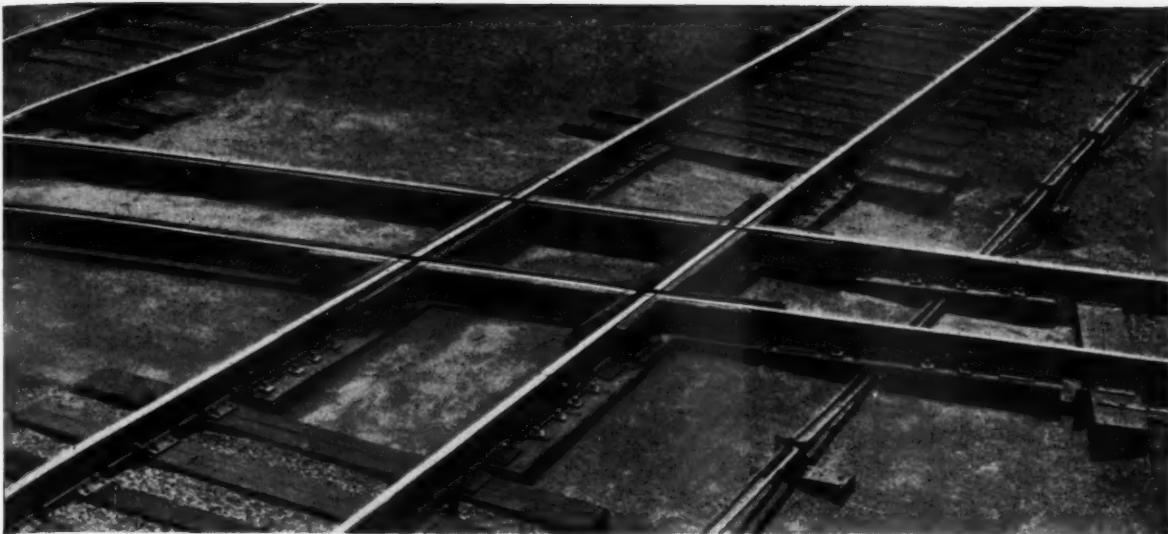
For details or a free demonstration of this, or other Kershaw equipment, contact one of Kershaw's sales representatives or write Kershaw Manufacturing Company, Montgomery, Ala.

**KERSHAW**  
MANUFACTURING CO. INC

MONTGOMERY



ALABAMA



▲ They blacktopped the ballasted areas around crossing to feed water into drains and carry-off gutters. Note heavy timbers laid longitudinally beneath rails for support.

## *Look what Great Northern did with this Bethlehem heat-treated crossing*



Here, on the Great Northern Railway near Superior, Wisconsin, is one of the finest examples of railroad crossings to be found anywhere. Beginning with precision-made, heat-treated Bethlehem 115 RE trackwork, Great Northern has followed through in every detail in creating a model of good maintenance-of-way practice.

Heat-treated crossings at this location are proving their worth through extra years of service to the GN, just as they have for many other railroads around the country. Nowhere will you find the equal of Bethlehem's



▲ They used supporting timbers 20 in. wide, 12 in. thick, and long enough to support the first joint area in each direction. Timbers were notched and bolted together, and anchored by 12-in. drive bolts with special washer to bear on flanges and base plate. Pads were used as cushioning under the plate.

◀ They installed drain traps in the center of the crossing to permit water to pass into drainage pipes imbedded beneath the road-bed. Crossing was fabricated and heat-treated by Bethlehem at the Steelton, Pa., plant, from 115 RE rail.

heat-treating equipment and experience, whether for crossings, frogs, switch points or rails up to 60 ft in length.

There may be places on your lines where heat-treated trackwork by Bethlehem would be a good investment. One of our engineers will be glad to talk things over with you at any location you select. You can reach him through the nearest Bethlehem district sales office.

BETHLEHEM STEEL COMPANY  
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

# BETHLEHEM STEEL



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**SPENO**



## BALLAST CLEANING and RAIL GRINDING SERVICE

The exclusive SPENO Method of Ballast Cleaning and the SPENO Rail Grinding Train have proved themselves to be time, cost, and maintenance savers for our contractual clients.

You may contract for one or both of these services—secure that you have joined company with many other outstanding and forward looking railroads.

Write today for future availabilities of equipment.

*Just Ask the Railroads  
That have used us!*



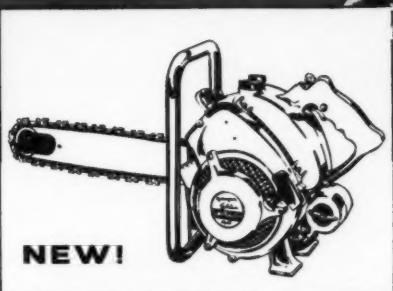
**FRANK SPENO RAILROAD BALLAST CLEANING CO., INC.**

306 North Cayuga St., Ithaca, N.Y.

*now, in chain saws, too,*

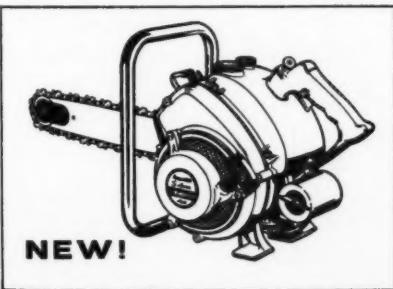
# if it's Remington, it's right!

Exclusive  
roller-bearing  
nose delivers  
up to 20%  
more  
cutting  
horsepower!



**NEW!**

Golden "Logmaster". 5 hp. class, 1 cylinder, air-cooled, 2 cycle. Bar sizes 18", 24", 30". 27 lbs. As low as \$285.00\* complete.



**NEW!**

Silver "Logmaster". 3 hp. class, 1 cylinder, air-cooled, 2 cycle. Bar sizes 18", 24", 30". 26 lbs. As low as \$229.00\* complete.

\*Prices and specifications subject to change without notice.

## More work in less time with less wear!

The greatest chain saw development in years! That's what timbermen call the revolutionary new Roller-Bearing Nose on Remington chain saws by Mall.

The nose actually revolves on precision-ground high-grade steel roller bearings (shown above in cutaway picture). And by reducing friction between bar and chain, the Roller-Bearing Nose increases chain speed up to three times, boosting actual cutting horsepower up to 20 per cent! Because of the faster chain speed, you can fell, buck and limb more timber in less time than ever before. And the reduced wear on chain and bar increases the life of both, an important money-saving factor!

The spectacular Roller-Bearing Nose is another power-boosting exclusive on the Remington line of Mall chain saws. No other make has it!

For a free copy of our new, fully-illustrated 24-page catalog showing the complete Remington line of Mall chain saws, just fill out the convenient coupon.

Fast, efficient chain saw service is available at a network of service stations. Write for our Chain Saw Service Directory or see your retailer.



**REMINGTON—manufacturer of sporting firearms and ammunition—famous for quality for 141 years.**

**MALL TOOL COMPANY**  
Division of Remington Arms Company, Inc., Dept. G30  
25000 S. Western Ave., Park Forest, Illinois

Please send your FREE railroad tool catalog.

NAME \_\_\_\_\_

RAILROAD \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_

# Remington Mall

MALL TOOL COMPANY, Division of Remington Arms Company, Inc.  
25000 S. Western Ave., Park Forest, Illinois.  
In Canada: Mall Tool Ltd., 38 Queen Elizabeth Blvd., Toronto, Ont.

WANT HELP IN KEEPING ACCIDENT COSTS DOWN—  
RIGHT-OF-WAY CREWS ON TARGET—AND ON TIME?



**AJAX Drinking Water Service offers  
3 BIG ADVANTAGES FOR TRACK MAINTENANCE GANGS**

- 1 AJAX Cups and equipment provide the cleanest, safest and most time-saving way to take clean, fresh water to gangs working on the right-of-way.
- 2 Crisp, clean AJAX Cups reduce the risk of spreading infections, like the common cold, that cause lost days . . . and thus help you keep important maintenance work on schedule.
- 3 The safety messages imprinted on AJAX Cups (at no extra cost) provide frequent reminders that help prevent accidents — another source of lost time and extra costs.

AJAX Complete Drinking Water Service was developed out of long experience with railroad work. It is ideally suited to the needs of track maintenance work . . . actually works three ways to help you save time, maintain schedules, and cut operating costs.

**WRITE TODAY** for samples of imprinted AJAX Cups and new folder giving details of this complete drinking water service.



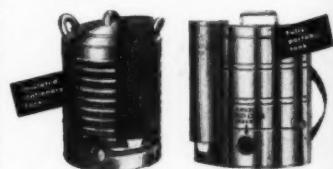
**United States Envelope Company**

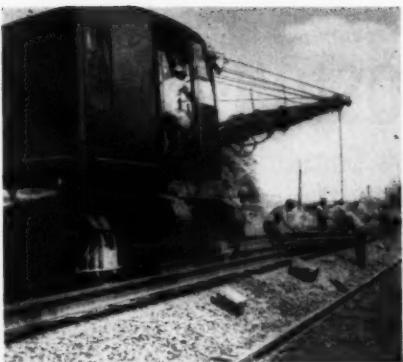
General Offices: Springfield 2, Massachusetts

15 Divisions from Coast to Coast



**AJAX® CUPS** — wedge-shaped, easy to hold—dispense open, ready to drink from; come in 4, 6 and 7 oz. sizes, imprinted with assorted stock safety messages at no extra cost — or your own message to order.





**WORK ON OR OFF-TRACK** with Koehring self-propelled RailAid®. It travels at 20 m.p.h. rail speed, gets on or off-track in 10 minutes. Lifts 6.9 tons on car, 8.9 tons on ground, converts to clamshell, dragline, piledriver,  $\frac{1}{2}$ -yd. shovel, hoe.

**GET MORE WORK CAPACITY** on work trains or independent off-track operation. Check all 5 sizes of Koehring heavy-duty excavators, with standard attachments for any construction, maintenance, and material-handling applications.

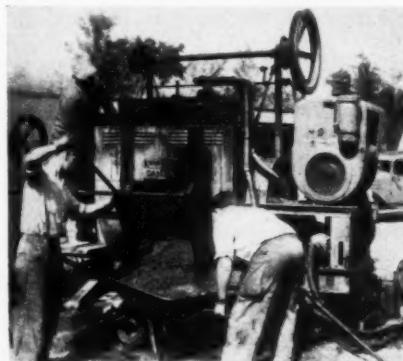


## Have you overlooked any of these IDEAS?



**LOAD BALLAST, RIP-RAP** from track-side pits and quarries into rail cars with Koehring Dumptors®. This 6-yard hauler has one-second gravity-dump (no body-hoist maintenance), 24% gradeability — has same speeds forward and reverse.

**STABILIZE TRACK BEDS**, correct softened ballast pockets in sub-grade, high fills and trestle ends with Koehring Mud-Jack®. Pumps soil-cement slurry into the weakened area, leaves firm sub-grade. No interruption to rail traffic.



**MAINTAIN SMOOTH CROSSINGS**, pave platforms, parking areas, walks with Kwik-Mix bituminous mixer. Sizes: 10 and 14 cu. ft. Mobile rubber-tire mounting. Adaptable as stationary central-mix plant, skid-mounted on platform.

**MECHANIZE MATERIAL-HANDLING** with Kwik-Mix Moto-Bug®. It's three tools in one — has interchangeable  $\frac{1}{2}$ -ton (6-foot) fork lift, 10 cu. ft. hopper, and  $\frac{3}{4}$ -ton platform. Larger size also available with multiple attachments.



**SPEED C.T.C. SYSTEMS** — On installation of underground cables and conduits, Parsons utility-size Trenchmobile® digs up to  $14\frac{1}{2}$  feet of trench per minute. Widths, 8 to 16 inches. Depths to 5 feet. Has 12.6 m.p.h. rubber-tired mobility.

**LOAD, UNLOAD CARS**, stockpile materials, clean ditches with Johnson all-welded clamshell buckets. Wide-rehandling, general-purpose, and heavy-duty-digging types. In 10 sizes from  $\frac{1}{2}$  to 3 cubic yards.

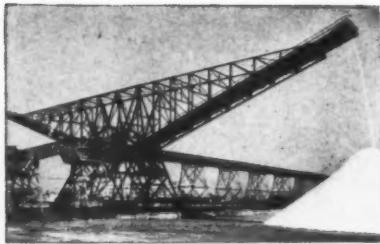


... KOEHRING Company

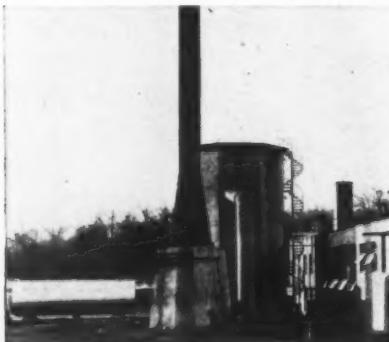


MILWAUKEE 16, WIS.

Subsidiaries: PARSONS  
KELLOGG - JOHNSON



**19 Years of Protection** were given this giant gantry crane at a salt-producing plant by a coating system of Bitumastic Super Service Black. Exposed to the corrosive combination of salt plus atmospheric moisture, the coating system has required only minor touch-up during this service.



**High Temperature Stack** is protected against corrosion by a coating of Bitumastic® Hi-Heat Gray, a zinc-base coating designed for high-temperature protection. Intermittent temperatures up to 1000° F. and continuous 800° F. dry heat will not affect this coating material, and it is widely used for protection of boiler breeching, stacks and other hot metal surfaces.



GET YOUR COPY of this new booklet on Bitumastic protective coatings. Use coupon below.

Koppers Company, Inc.  
Dept. 116G  
Pittsburgh 19, Pa.

Please send me "For Lasting Protection Against Corrosion . . ."

Name \_\_\_\_\_  
Company \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_

## how to **CUT CORROSION LOSSES**

a report by Koppers Company, Inc.



Russell C. Stromquist  
Corrosion Consultant

Recently, we were asked to recommend protective coatings in a plant on the West Coast. In analyzing their coating and enamel needs, we did our usual survey of the installation. After the survey, the customer's Chief Engineer remarked, "You fellows certainly go to a lot of trouble just to tell us what coating system we should use."

We do—because we know it is good for our customers and, therefore, good for us. Case history records prove clearly that careful study before making recommendations insures a better protective coating job at

lower annual cost. In analyzing protective coating needs, our corrosion engineers follow a "pre-coating check list" based on experience on thousands of jobs.

\* \* \*

The first step in the pre-application survey is a study of the environment. Specifically, you should always take into account the corrosive atmosphere: such factors as acid fumes, intense sunlight, salt air, etc. Physical environment—exposure to abrasion or impact—also plays an important part in the selection of an effective coating system.

The extent of temperature variation and expected minimum-maximum temperatures are important considerations, since the coating chosen must (a) resist low-temperature embrittlement, (b) resist high-temperature flow and (c) harden properly at service temperature.

The moisture environment too, is important in selecting protective coatings. Besides necessary water resistance, the coating should stand-up under pronounced wet-dry cycles.

A thorough cost analysis is a vital part of any pre-coating survey. Many factors are involved, varying in importance with the specific application. For example, total coating cost—made up of surface preparation and application costs—must be balanced against the cost of periodic maintenance. In some cases, the coated surfaces will not be accessible and coating-life will be a *direct* measure of the life of the material.

The cost of probable shut-down or loss of production time is perhaps one of the most important evaluations that must be made in intelligent selection of corrosion-preventing coating systems. Often, it outweighs the direct replacement costs of materials to be protected.

\* \* \*

This pre-coating check list, detailing the protection required and, under what circumstances, is a key factor in the exceptional performance of Bitumastic® coatings. Such thoroughness sometimes leads us to willingly recommend some material other than one of Koppers eleven basic Bitumastic coatings to solve a customer's problems.

\* \* \*

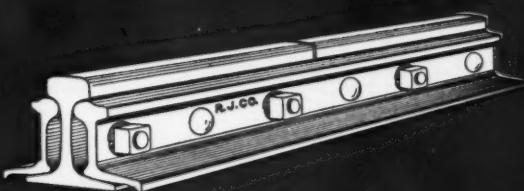
In the next report, we will discuss why surface preparation is so vital to the life and economy of any protective coating. Meanwhile, we'd like to hear about your corrosion problems. Koppers Company, Inc., 1300 Koppers Bldg., Dept. 116G Pittsburgh 19, Pa. District Offices: Boston, Chicago, Los Angeles, New York, Pittsburgh and Woodward, Ala.



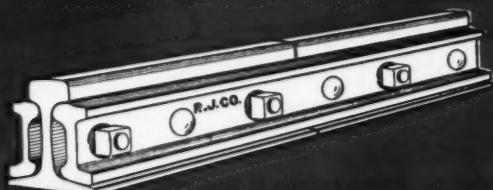
**BITUMASTIC**  
REG. U. S. PAT. OFF.  
**COATINGS AND ENAMELS**

# RAJO...

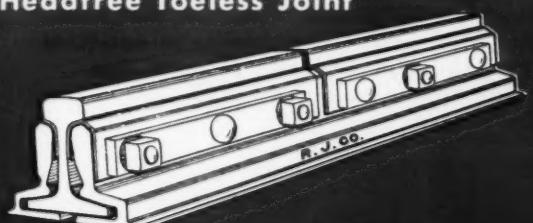
*Designed for Those  
who demand the best*



Headfree Flanged Joint



Headfree Toeless Joint



Armored Insulated Joint



Rajo and Compromise Joint

FOR OVER SIXTY YEARS the Rail Joint Company has specialized exclusively in the design and manufacture of rail joints. The most notable improvements include the better distribution of metal, longitudinal reinforcing rib, vertical ribbing of the joint base, introduction of the head free feature and the more recent refinements such as head encasement and curved base bearing, all of which have materially contributed to a better rail joint.

The Insulated joint offers the all-important feature of providing an integrated support under the rail bases, thus securing maximum bearing surface for the insulation and insuring its relatively long life if the joint is correctly applied and maintained.

Rajo Compromise joints connecting rails of different sections or those of the same section having varying degrees of vertical and/or lateral wear are of an improved and modified base design with the metal so distributed as to offer maximum strength at the joint center where the greatest stresses occur.

**RAIL JOINT COMPANY**

DIVISION OF POOR & COMPANY (INC.)

50 CHURCH ST.

NEW YORK 7, N. Y.



## RE-BALLASTS BRANCH TRACKS AT $\frac{1}{3}$ SAVINGS!



New York Central's Joliette branch line before re-ballasting. Old ballast is heavy and wet.



New York Central plows-out foul ballast, renews ties, in one fast-moving operation.



After passage of Mannix Plow, road-bed is smooth and level, ready to receive fresh ballast.

The modern way of doing things is the only way for New York Central! That is why the road makes extensive use of MANNIX PLOWS to re-ballast track. The result: faster, better maintenance at one-third savings! Speed your maintenance program, too . . . send for full details of the MANNIX PLOW and Rental Plan today!



4020 Minnetonka Blvd., Minneapolis, Minnesota

Phone: WA-7-9411

*right  
for  
rail  
joints*



AREA Track Committee Photo

## STANDARD Petrolatum HMP

(High Melting Point)

If you use STANDARD Petrolatum HMP for rail joint lubrication and corrosion protection you get some important benefits. Here are three:

- 1 Easier track maintenance.
- 2 Less chance of damage from joint freezing.
- 3 Longer rail joint life.

This is how STANDARD rail joint lubricants work to give you these benefits: Rail joint bolts are prevented from corroding. Nuts turn easily when joints have to be opened or tightened. Lubricant protects bolts from freezing and shearing in cold weather. Joint bars and rails are protected from wear, their service life is extended.

STANDARD Petrolatum HMP seals joints thoroughly and one application lasts years. The lubricant won't run off in hot weather or freeze up when it's cold. It is not affected by water washing or dissolved by brine dripping from refrigeration cars. It is easy to work with and apply.

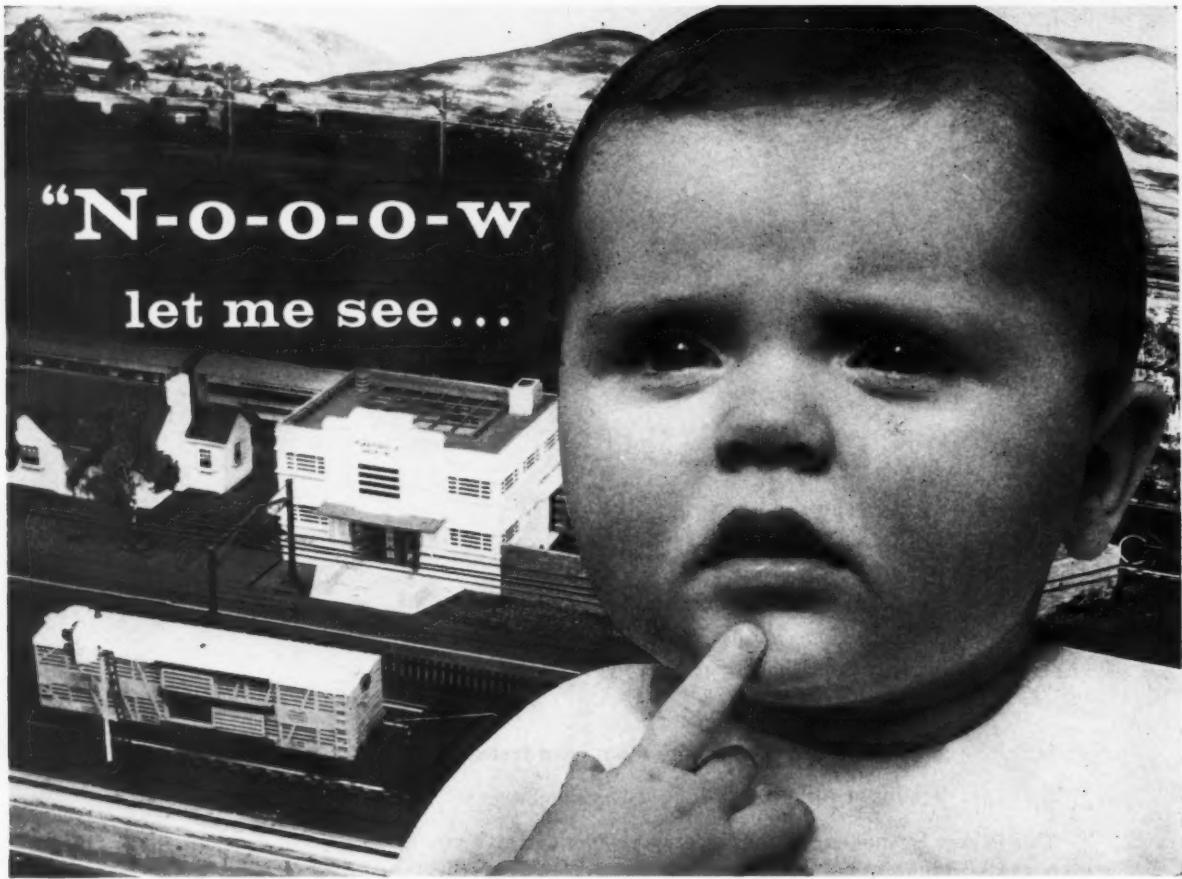
Get more information about STANDARD Petrolatum HMP and other Standard Oil maintenance of way lubrication products. Write or call Standard Oil Company, 910 S. Michigan Avenue, Chicago 80, Illinois.

### Quick Facts About STANDARD Petrolatum HMP

- Seals thoroughly
- Unaffected by high or low temperatures
- Won't water wash
- Not affected by brine dripping
- Penetrates and protects rail, joint bar, nut and bolt threads



STANDARD OIL COMPANY  
(Indiana)



**"N-O-O-O-W  
let me see..."**

**...that comes to a saving of \$1050 per mile...  
per year...in tie renewals alone...just by  
installing Bird Self-Sealing Tie Pads."**

When you save \$1050 per mile of track, per year — it doesn't take long to get back your original investment in Bird Self-Sealing Tie Pads.

Suppose your ties last 20 years. That's about average under normal operating conditions. Your renewals would be approximately 5% — or 150 ties per mile per year. At a conservative cost of \$7.00 per tie (original cost plus installation) this amounts to \$1050 per year.

OK? Now, suppose your out-of-face installation includes Bird Self-Sealing Tie Pads. With a sound tie con-

dition, renewals are eliminated for at least 15 years. You save \$1050 per mile of track per year.

In less than four years, you've saved the entire cost of the Bird Self-Sealing Tie Pads. From then on, that saving represents pure profit, year after year!

Bird Self-Sealing Tie Pads are the only tie pads whose durable and effective seal with the tie has been proved through years of in-track service. Want complete information? Write to Bird Tie Pads, Department HTS, East Walpole, Massachusetts.

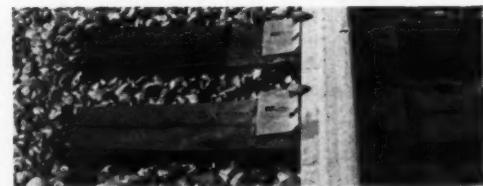
#### *Bird Self-Sealing Tie Pads Are Recommended For:*

Bridge Decks • Curves • Switch Timbers • Highway Grade Crossings and Other Paved Areas • Crossing Frogs • Insulated Joints • With Smaller Tie Plates • Pile Cutoffs • Through Station Platforms • Out-of-Face Installations in Rail-Laying Programs • Locations where tie life is short or replacement costs are high.

*Buy the Best...*



*Buy BIRD*



These ties were mechanically abraded to provide a smooth surface on sound wood. They start a new life cycle through the protection offered by Bird Self-Sealing Tie Pads. Moisture and abrasive materials cannot penetrate the seal.



**SPEED UP  
RAIL RENEWAL  
OPERATIONS**

...use the **NORDBERG**  
**BALLAST ROUTER**  
for quick removal  
of troublesome  
**HIGH CRIB BALLAST**



**NORDBERG**  
"Mechanical Muscles"

Designed for removing high crib ballast which would interfere with the operation of adzers in rail renewal operations, the Nordberg *Ballast Router* cuts a flat trench, the depth of which can be set by an adjustable stop, and sweeps the area of the tie to be adzed.

Operated by two men, the *Ballast Router* easily and quickly removes high ballast, improves track drainage, and simplifies application of rail anchors. No objectionable void is left in the crib under rails which would require filling later.

The digging element incorporates years of complete cribbing experience gained with the Nordberg Cribex® . . . and the entire *Ballast Router* is built with the same rugged construction found in all other efficient Nordberg Railway Track Maintenance Machinery.

For complete information, write for your copy of Bulletin 240. Nordberg Mfg. Co., Milwaukee, Wis.

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R657

BALLAST ROUTER • BANTAM RAIL SLOTTING • CRIBEX® • BALLASTEX® • SCREENEX® • SPIKE HAMMER • TIE DRILL  
HYDRAULIC and MECHANICAL SPIKE PULLERS • POWER JACK • POWER WRENCH • RAIL DRILL • RAIL GRINDERS  
SURF RAIL GRINDER • TIE-KAT® • TRAKLINER® • TRACKSHIFTER • DUN-RITER GAGING MACHINE and BRONCO  
DSLW YARD CLEANER • GANDY® • TIE PULLER and INSERTER • GANG TAMPER • SELF-PROPELLED ADZER.





**Keep your way  
safe, attractive with  
a new "crew" . . . Dow Brush and Weed Killers**

This signal was set a hundred miles away by an operator at a CTC panel board. And one of the reasons he can be sure signals and switches will respond to the flick of a switch is because the way has been kept clear with Dow brush and weed killers . . . the modern way to control vegetation on modern railroads.

Of course, chemical brush and weed



miles  
panel  
e can  
ill re-  
is be-  
clear  
killers  
vege-  
weed

killers are the only practical way to keep ballast clean. They help obtain proper drainage, reduce heaving, keep track circuits free of vegetation.

But what about the rest of the right of way? Clean, clear ways mean better visibility at grade crossings and around curves. They give passengers a more attractive view and make you a better neighbor to farms and towns. Com-

munication lines and signal systems remain clear of dangerous brush and weeds.

Vegetation control with Baron®, Rada-pon® and other brush and weed killers in the complete Dow line costs less than you might think. Professional applicators—who have the experience, equipment and trained personnel—can actually save you money. They can

use the right combination of chemicals to give you more mileage for your maintenance dollar.

For more information about how Dow brush and weed killers are a vital part of modern railroading . . . and the name of a qualified applicator . . . write to us today. THE DOW CHEMICAL COMPANY, Agricultural Chemical Sales Dept., Midland, Michigan.

YOU CAN DEPEND ON





# A MILESTONE IN **RIBBONRAIL** SERVICE!

## *Pressure Welding Proves Efficient, Economical*

With completion of the 500,000th oxy-acetylene pressure weld, a milestone in the acceptance and development of RIBBONRAIL service has been passed. Today, railroads are saving thousands of dollars annually on track maintenance in yards and stations, on bridges, and in main line track . . . and still greater savings are in the making.

## *Welded Joints Now Cost Less Than Bolted Joints*

The history of welded rail is one of increased operating efficiency, and lower weld cost. Today it actually costs less to weld rail than it does to connect it with bolted joints. Smooth, "clatter-free" welded rail eliminates the cost of battered rail end build up, and signal bond and joint bar maintenance. Yes, RIBBONRAIL service is the trend in modern railroading.

Plan your RIBBONRAIL service program now. Call or write your local LINDE representative for detailed information.

### RAILROAD DEPARTMENT

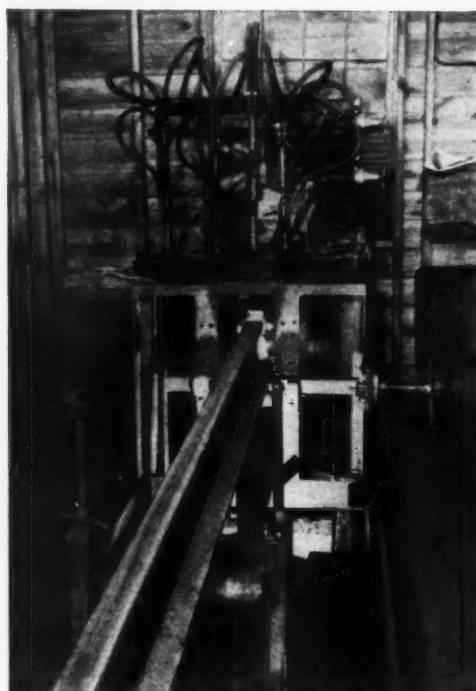
## **LINDE COMPANY**

DIVISION OF



CORPORATION

30 East 42nd Street, New York 17, New York  
In Canada: LINDE COMPANY, Division of Union Carbide Canada Limited, Toronto  
"Linde," "Oxweld," and "Union Carbide" are registered trade-marks, and "Ribbonrail" is a service mark of Union Carbide Corporation.



Weld passes through a "normalizing" machine above. When it cools, the weld will be ground—and then ready for service.

The familiar symbol of over forty years' service to the railroad industry.



RAILWAY TRACK and STRUCTURES

# JUDGE IT by the company it keeps

HVILLE, CHATTANOOGA & ST. LOUIS • ILLINOIS CENTRAL • CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC • ELGIN,  
ET & EASTERN • ATCHISON TOPEKA & SANTA FE • BALTIMORE & OHIO • BALTIMORE & OHIO CHICAGO TERMINAL  
ORTHERN PACIFIC • TEXAS & PACIFIC •  
AGO & NORTHWESTERN • ALASKA R.R.  
S. STEEL CORP. • GREAT NORTHERN •  
WORTH & DENVER • CHICAGO, BURLINGTON  
INCY • DELAWARE & HUDSON • CENTRAL  
EORGIA • PENNSYLVANIA R.R. • CHICAGO  
TERN ILLINOIS • MINNEAPOLIS & ST. LOUIS •  
ERN MARYLAND • MISSOURI-KANSAS-TEXAS  
SSOURI & PACIFIC • CHICAGO, ROCK ISLAND  
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SKA R.R.



## THE JACKSON TRACK MAINTAINER

The list of JACKSON TRACK MAINTAINER users reads like a large portion of "Who's Who in Railroads". And the reason for it is this: WHENEVER EXPERIENCED TRACK MEN INVESTIGATE, THEY FIND CONCLUSIVE EVIDENCE THAT THE JACKSON TRACK MAINTAINER PUTS UP PERFECT TRACK IN A WIDER RANGE OF BALLAST AND CONDITIONS THAN ANY OTHER TAMPING EQUIPMENT. Let us furnish you with the complete facts or tell you where you can see these machines in action. How about picking up that phone, right now?

JACKSON VIBRATORS, INC. LUDINGTON, MICHIGAN

RAILWAY TRACK and STRUCTURES

JULY, 1957 17



**Cleaning up** along main line right-of-way, D Tournapull® self-loads . . . strips vegetation and top soil, fast . . . then excavates root-laced clay. Working alone, LeTourneau-Westinghouse "Handyman D" loads 5 cu. yds. or more in less than a minute. With pusher, machine heaps extra yardage into 9-yd. capacity bowl. 29.5 mph "D", with one-man crew, does job fast at lower cost than other equipment.



**At approach of traffic,** "D" drives up on bank. As soon as line is clear, it goes back to work. No time is lost deadheading work trains to nearest siding. Through traffic is not delayed. Multi-disc 4-wheel air brakes hold this self-propelled scraper safely on side slope.

**Turning 90°** in radius of only 12'1½", "D" moves into position for spreading. Fast-moving Handyman never blocks right-of-way. Tires do no damage to rails, switches . . . won't chamfer ties, trip or damage block signals. Big, tough pneumatics resist wear.

**Sloping 4-to-1 bank,** "D" does shapes bank cut into 4-to-1 slope. Other jobs: repairing washouts . . . stockpiling coal . . . plowing snow . . . clearing right-of-way. D Tournapull can be used all the year-around . . . interchangeable attachments extend its work range.



## LeTourneau-WESTINGHOUSE Company

RAILROAD SALES DIVISION, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit



Self  
self-l  
rock  
tial,  
wheel  
starts  
loose

Send  
Name . . .  
Company  
Street . . .

# HOW

## your railroad can cut costs with Tournapulls



**Reinforcing grade,** dozer-equipped "D" spreads clay in even layers along shoulder of right-of-way. Instant-acting electric controls, at operator's fingertips, insure accurate cutting and spreading. "Handyman D" does the entire job... forget about auxiliary work units.



**Self-powered moves** at speeds to 29.5 mph save delays, get more work done. With big, low-pressure rubber tires, Tournapull drives along right-of-way without damage to ties or tracks. "D" is independent of tracks and trailers, no time is lost loading or unloading.



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**Self-loading ballast,** "D" Tournapull self-loads more than 4½ cu. yds. of 1½" rock per load. Power-transfer differential, which applies 4 times the power to wheel on firmest footing when one wheel starts to slip, keeps "D" pulling through loose, soft, or slippery material.

**Spreading ballast,** "D" deposits thin, even layer from 1" to 10" deep... can also dump entire load in one spot. Operator will later level ballast, lowering dozer blade to "float" on rails and act as a depth shoe. Tracks of all gauges are spanned by 8'1" wide blade.

**At stockpile,** "D" uses its bulldozer blade to side-cast screened rock before self-loading ballast for spread along right-of-way. Electric-control blade gives fast, smooth dozing action. Tournapull has plenty of power (138 hp) and maneuverability (90° turns in 12'1½").

Send now to: **LeTourneau-WESTINGHOUSE Company PEORIA, ILLINOIS**

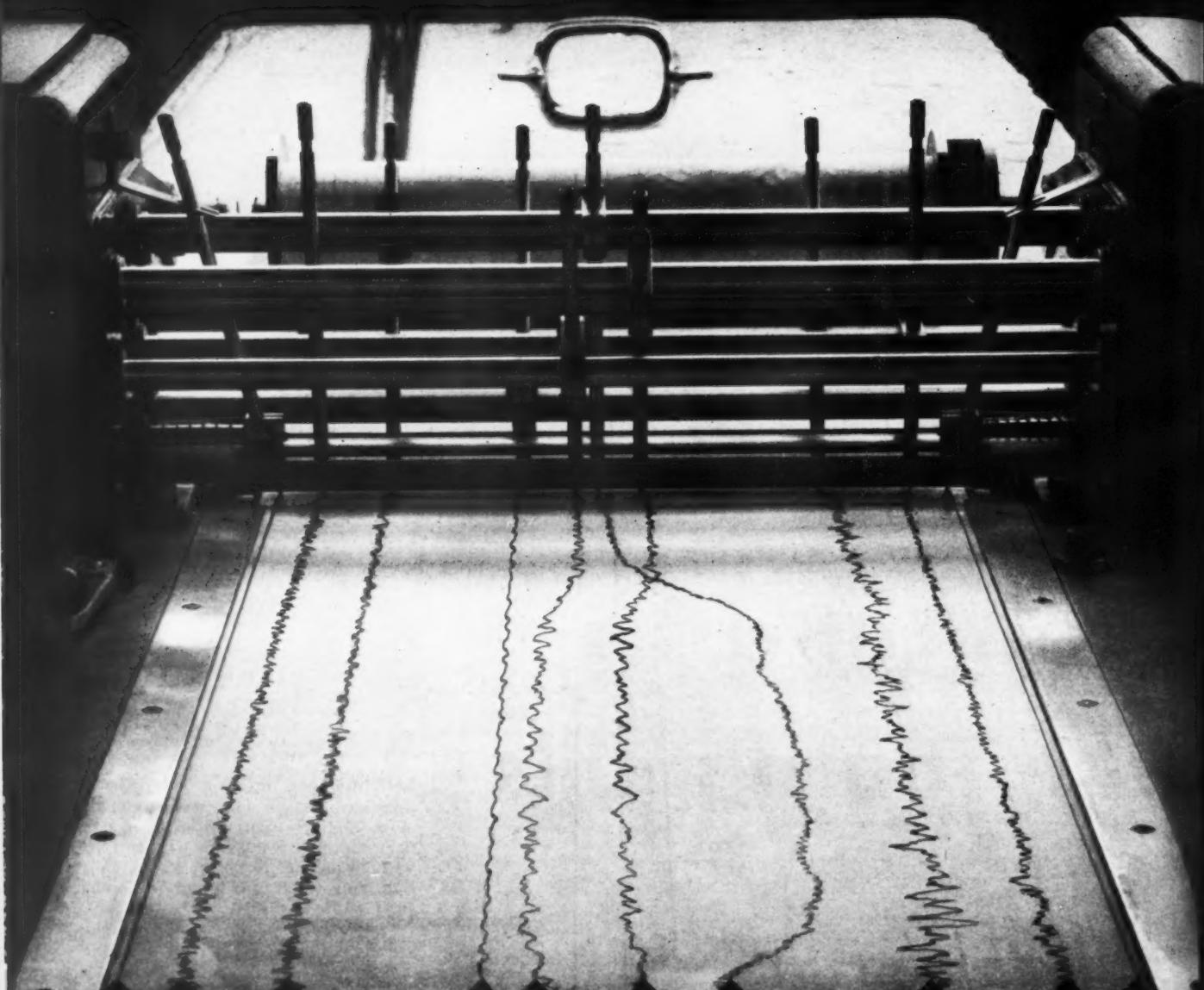
Name..... Title.....

Company.....

Street..... City..... State.....

FREE... "The Railroad Handyman" 20-page booklet shows how the new 9-yd. self-loading D Tournapull cuts time and costs on right-of-way maintenance. Send coupon for your free copy. No obligation. Also ask to see our color movie, "Clear the Track".

DP-1211-RK-2



REF-  
ERENCE  
POINTS

WARP

VARIATIONS  
OF GAGE

MID-  
SPEED ORDINATES

MID-  
ORDINATES

SUPER-  
ELEVATION

left  
rail      right  
rail

LOW-HIGH  
POINTS

left  
rail

HIGH-LOW MILE  
POINTS POSTS

right  
rail



**HART a  
TRUE COURSE for your  
TRACK MAINTENANCE forces with a  
MATISA "TRACK-FAX"®  
Recording Car**

- Ask how to get a  
**FREE TRACK-FAX® chart ...**  
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**EQUIPMENT CORPORATION**

1020 Washington Avenue • Chicago Heights • Illinois

**REPRESENTATIVES**

Railroad Materials Corporation:

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Blair Blowers, Jr., 345 Pattie Drive, Berea, Ohio

R. M. Hitchcock, 1025 Crescent Ave., Macon, Ga.

St. Louis Railway Supply Co., Railway Exchange Bldg., St. Louis 1,

Frank B. Nugent, 710 Pioneer Bldg., St. Paul 1, Minn.

## News notes . . .

. . . a résumé of current events throughout the railroad world

The railroads have been authorized by the Interstate Commerce Commission to file schedules for an increase in demurrage charges. They provide for charges of \$4.00 a day per car for the first four days beyond "free time" and \$8.00 a day thereafter. Present charges are \$3.00 a day per car for the first four days a car is held beyond the two days of "free time" and \$6.00 a day thereafter.

A purchase-by-mail plan for commuter tickets will become effective on the New York Central next September 1. The plan, called "Chek-It," is based on the results of a recent survey which indicated that a majority of the railroad's commuters want to receive their commutation tickets regularly by mail. Commuters subscribing to the system will have their tickets mailed to their homes on the 26th of each month. Payment can be made to the railroad by mail.

A year-long experiment in developing passenger traffic—the paying of 5 per cent commissions on point-to-point travel to travel agents and tour operators recognized by the Rail Travel Promotion Agency—has been launched by 18 railroads in the United States and Canada. The commission will be available on tickets sold for trips between some 43 specified cities scattered all over the United States.

Champion McDowell Davis, president of the Atlantic Coast Line, has retired. Mr. Davis celebrated his 78th birthday on July 1.

President Walter Tuohy of the C&O, speaking before a group of financial analysts recently, reiterated his company's interest in diversifying—not only by investments in other kinds of transport but in other types of business. He expects C&O's traffic and earnings to keep on growing, and said that 1957 will be "at least as good" as '56, the road's most prosperous year to date.

A new set of demands have been served on individual railroads by the Brotherhood of Maintenance of Way Employees. The demands, embodying 10 new rules, were served by the brotherhood to "check" what its president, T. S. Carroll, called the "fearful slaughter" of jobs in the maintenance of way craft due to mechanization of maintenance work. Among other things, the rules would provide that changes in work methods would be subject to prior agreement with the general chairman.

Agreement on a 26 1/2-cent "package" pay increase over a three-year period, has ended the wage dispute between the nation's major railroads and the order of Railway Conductors and Brakeman. Members of the union will receive a 12 1/2 cent increase retroactive to November 1, 1956, and further increases of 7 cents each on November 1, 1957, and November 1, 1958.

The Santa Fe and the Pennsylvania have been authorized by the ICC to acquire control of the Toledo, Peoria & Western through ownership of capital stock. At the same time, the request of the Rock Island and Nickel Plate for authority to be included on an equal basis in the acquisition was denied, and the application of the Minneapolis & St. Louis for authority to acquire control of the TP&W alone was dismissed.

**FAST**

**ECONOMICAL**

**SAFE WAY**

*to keep  
switches  
snow free...*

*the RACOR®*

**IT'S FAST**—Snow does not get an opportunity to pile-up between switch points and stock rails with the Racor Snow-Blower on the job. It protects against sleet too! Strong, intermittent blasts of air—every few seconds—keep these sections as clean-as-a-whistle. This mechanical device is simple in construction. It consists of a source of compressed air, an anti-freeze injector, a cycling device and two manifolds equipped with adjustable nozzles. Existing air supply and air lines can be utilized.

**IT'S ECONOMICAL**—The Racor Snow-Blower is simple to install, easy to maintain, and economical to operate. This dependable device relieves the need for manual attention in bad weather, saving hours of time, labor and expense. It can be adapted to remote control operation if desired. The Racor Snow-Blower offers big savings in operating costs . . . far more than other snow removal methods.



# SNOW-BLOWER

**IT'S SAFE**—This advantage is the most important of all. Employees are not required to manually clear switches when conditions and visibility are bad. Also—with heat source eliminated—there's no problem of water from melted snow or ice, and no hazard of fire to track and operating equipment.

The Racor Snow-Blower has been field-tested and proven during many winters under extreme snow conditions. Take advantage of the fast, economical and safe Racor Snow-Blower next winter—you'll be thankful you did.

**Brake Shoe**

RAILROAD PRODUCTS DIVISION  
530 Fifth Avenue • New York 36, N.Y.

RAILWAY

## TRACK and STRUCTURES

# Dear reader:

### Our Objective: Saving time for you

We don't have to ask if time is important to you. We know it is. And it's getting to be more important all the time, both on and off the job.

Let's consider, first, the matter of the importance of time off the job. Theoretically you—and almost everyone else—have more "leisure" time than ever before. At least your working hours are the shortest in history. But the important question is this: Do you actually have more time to do the things you want to do? We don't and we doubt that you do. Why?

The answer is simply that there are more things the average person wants to do. We don't need to catalogue here all the things that people have to do in their "spare" time; you can do that for yourself. There's just one item we want to mention: reading. Chances are you will either say there is more to read today, or less time in which to do the reading you've always done. That's one reason why our company, as a publisher of trade magazines, is deeply interested in the problem of time.

Then there's the matter of time on the job. Think of how many ways you are being urged to save time for your company. There's man-time, machine-time, job-time, travel-time, on-track-time, and many other different kinds of time in this category, and they can practically all be translated into dollars—dollars saved or dollars wasted depending on the effectiveness with which these different kinds of time are used. We can lump them together and call them dollar-time.

It is now evident to us, as a publishing company, that your time is more precious today than ever before, and we've decided to do something about it. Henceforth, saving time for our readers will be a guiding principle in the editing of all Simmons-Boardman publications. Let me tell you briefly something about our plans for making *RT&S* a "time-saver" publication for you. Here's how we hope to save your . . .

... **Reading-time**—Our efforts along this line will actually amount to an intensification of what we have been doing for a long time, i.e., the presentation of ideas in such a way that you will be able to grasp them in a minimum of time. This not only means relying heavily on photographs and other illustrations, but also the use of pictures and text in such a way that they work together to produce fast reading. It means also the use of presentation techniques that make it possible for you to grasp the basic idea quickly, while at the same time giving more details if time permits you to probe further into the subject.

... **Dollar-time**—Your need here is for ideas on how to improve the performance of the forces under your supervision. Our objective has always been to place such ideas before you. Now we intend to put even greater emphasis on the selection of story material that will help you save dollar-time.

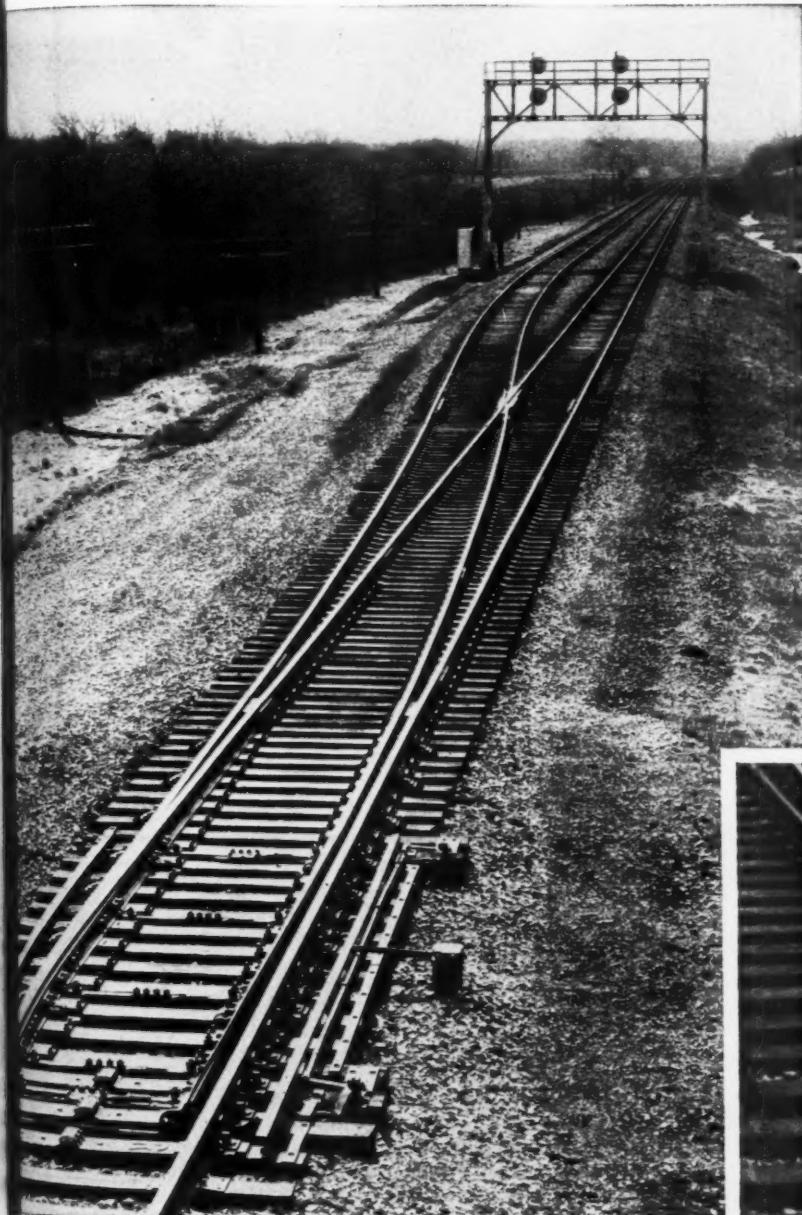
Our objective, in other words, is to make it possible for you, through the pages of this magazine, to obtain information in a *minimum* of reading-time that will enable you to conserve a *maximum* of dollar-time. The legend on the front cover, "A Simmons-Boardman time-saver publication," will be a constant reminder to us of this objective.

MHD

# USS Heavy-Duty Interlocked Turnout carries heavy freight traffic at 40 mph on new CTC installations

Bessemer and Lake Erie's new CTC installation from Albion to North Bessemer, Pa., (125 miles) carries heavy freight—and lots of it. Day-in day-out, around the clock, long trains carrying coal and ore whistle by at 40 miles an hour. Punishing traffic like this calls for the best in trackwork, especially frogs and switches.

## HEAVY • FAST • POWER-OPERATED



The USS Turnout shown here is designed for operations where heavy freight trains move rapidly over interlocked switches. To combat side thrust, USS designed a rigid split switch with Sampson-type points that are doubly reinforced, insulated and heat-treated. In addition, special plating together with USS Taylor\* Rail Braces was also used in this switch. The #20 railbound manganese steel frog is type A.R.E.A. 625, with special plating.

Proper design followed up with painstaking accuracy and care go into all USS Trackwork. This constant attention to the very finest detail means that you get maximum service from every piece of equipment bearing the USS label. You'll find it pays to specify USS Trackwork.

The 39-foot-long Sampson-type switch points are doubly reinforced, insulated, heat-treated and have special plating. Rail braces are USS TAYLOR\* adjustable braces. The Rail Section is USS 14031 (140% A.R.E.A.).

\*TAYLOR is a registered trademark of United States Steel Corporation for its adjustable rail brace.

The #20 frog is of railbound manganese steel construction—A.R.E.A. 625, with special plating.



## TRACKWORK

UNITED STATES STEEL CORPORATION, PITTSBURGH  
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO  
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.  
UNITED STATES STEEL EXPORT COMPANY, NEW YORK



**Standardize on Longer Life...**

**FAIRBANKS-MORSE Steel Wheels**



Conform Strictly  
to  
**A.R.E.A. Standards**

When you need replacement wheels in 20", 16" or 14" sizes, standardize on F-M quality for longer life.

Every step, from sheet steel purchase to finished wheel in stock, is under Fairbanks-Morse inspection and control. Every wheel is cold formed in our own plant, on our own presses using our own modern dies . . . is machined and finished to a design of simplicity and strength. Extra thickness and hardness are provided at the areas of greatest wear.

This constant control of quality is your assurance that F-M demountable wheels are the sturdiest track car wheels on the rails today. Fairbanks, Morse & Co., Dept. RTS-7, Chicago 5, Illinois.



**FAIRBANKS-MORSE**

*a name worth remembering when you want the BEST*

DIESEL LOCOMOTIVES & ENGINES • MOTOR CARS & RAILROAD EQUIPMENT • ELECTRIC MOTORS • GENERATORS • PUMPS • SCALES • WATER SERVICE EQUIPMENT • HAND LAMPS

1931 ← 26 CONSECUTIVE YEARS → 1957  
**MODERN BALLAST CONDITIONING**



BEFORE "R. B. C. C." Service



AFTER "R. B. C. C." Service

"R. B. C. C." ballast cleaning service has earned its outstanding performance record from 26 years of successful operation. Our 3 and 5 unit trains are entirely self contained on our own standard railroad equipment—No railroad cars are used or tied up.

"R.B.C.C." 5 unit equipment does a thorough ballast conditioning job, cleaning two center ditches or two shoulders or one of each at one trip.

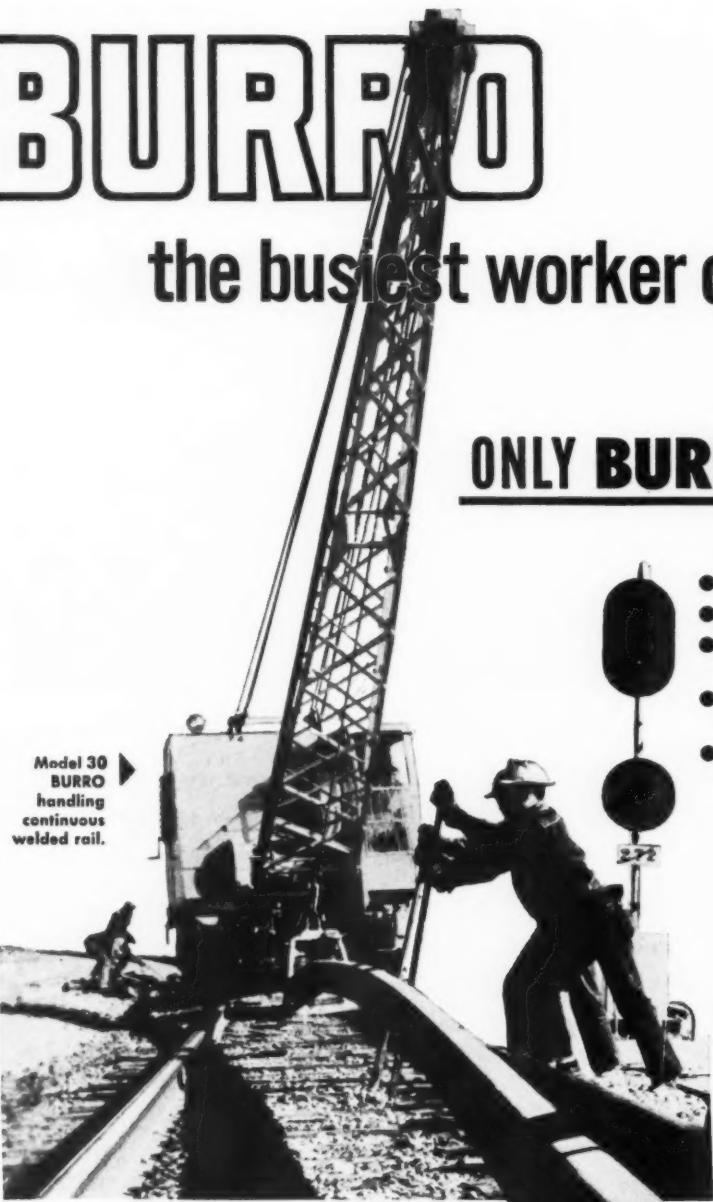
"R.B.C.C." 3 unit equipment, self propelled, does a thorough ballast conditioning job, cleaning one shoulder at one pass on one side only.

"R.B.C.C." ballast cleaning or excavating service, complete with our own personnel and equipment, is handled on contract basis.



# BURRO

## the busiest worker on the track



Trackwork—a BURRO Crane specialty, is just one of countless jobs these fast, powerful workhorse units are doing on the railroad today.

Pound for pound, there's more work power and versatility built into BURRO Cranes than any other unit. A BURRO takes any job in stride. In the yard or on the line, it is unequalled for speed and economical performance.

BURRO Cranes are made in three models—Model 15A, Model 30, and the larger Model 40. BURRO Crane catalogs have the full story on these time and money-saving machines. Write for them.

### ONLY BURRO CRANES HAVE ALL THESE ADVANTAGES:

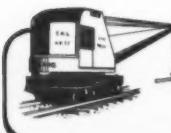
- Fast travel speeds . . . up to 28 MPH
- Draw bar pull in excess of 9000 lbs.
- Elevated Boom Heels for working over high sided gondolas
- Short tail swing—will not foul adjoining track
- Low overall height. BURRO can be loaded and worked on a standard flatcar.



Model 30 BURRO stockpiling rail at welding site.



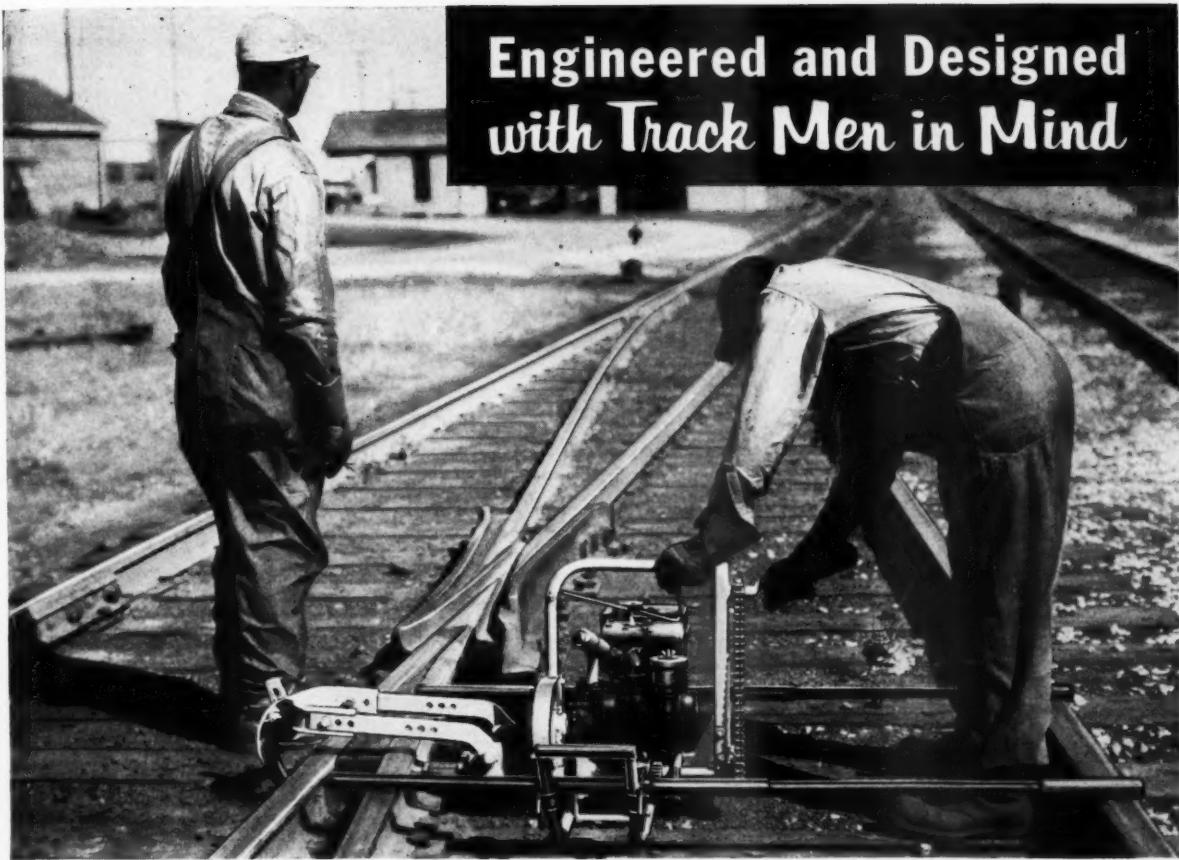
New track construction with a Model 30 BURRO is a fast, efficient operation.



**CULLEN-FRIESTEDT CO.**

1301 SOUTH KILBURN AVENUE • CHICAGO 23, ILLINOIS





## Engineered and Designed with Track Men in Mind

### WESTERN FORMERLY BUDA Power Track Drill

Here is a vital piece of equipment in keeping track modernization, expansion and maintenance programs in high gear—the Model P power track drill that has ALL the features essential to economical operation.

#### EASILY SET UP...and ACCURATE.

Can be located from top of rail (with optional telescopic support and locator rods) or positioned on ties and ballast (with long overclutch and adjustable rail guide). No change in set up necessary while working on same size rail.

**COMPACT and PORTABLE.** Weighs only 130 pounds. Can be started, operated and slid along the rail by one man. Easily carried overland by two men.

**DEPENDABLE.** Gives all-weather, long-life service. Powered by easy-starting 1½ h.p., 4-cycle Briggs & Stratton air-cooled gas engine. Equipped with Tim-

ken roller thrust bearing. Versatile spindle sleeve handles all flat drills from  $\frac{1}{16}$ " to  $1\frac{1}{16}$ ".

**SAFE.** Can be released and removed from track within 10 seconds . . . no stopping and backing off.

**CONTROLLED FEED.** Avoids broken and prematurely dulled drills. Sensitive crank-chain mechanism allows operator to vary the thrust accurately according to the hardness of the rail and sharpness of the drill.

**FAST.** Drills  $1\frac{1}{8}$ " hole in 90 lb. rail in 30 seconds . . . in 155 lb. rail in less than 90 seconds.



#### HYDUTY-PAULUS MANUAL TRACK DRILL

A track maintainer's tool that every section house should have. Special safety and adjustment features assure precision drilling plus instant emergency detachment.

8603

Write for  
Detailed Information



# WESTERN

Maintenance-of-Way Division

RAILROAD  
SUPPLY  
COMPANY

2400-2434 South Ashland Ave. • Chicago 8, Illinois

IN CANADA: Melville Machinery Co., Ltd., Montreal 3, Quebec

One of a series of ads featuring new WESTERN products formerly supplied by BUDA

## RAILROAD

**CANADIAN NATIONAL**—D. A. Slack division engineer at Edmundston, N. B., has been promoted to assistant engineer maintenance of way of the Atlantic Region, with headquarters at Moncton, N. B., succeeding H. A. Fuller, retired. R. J. Tingley, assistant engineer on the London division, has been promoted to division engineer at Edmundston, succeeding Mr. Slack.

L. M. Poltevin, assistant district engineer of the Quebec district, has been promoted to district engineer of the same district with headquarters at Quebec, Que., succeeding G. E. Corriveau, who has been named special engineer with the same headquarters.

F. S. Barker, assistant division engineer of the Montreal Terminals and St. Jerome divisions, has been promoted to division engineer of the same territories, with headquarters at Montreal, Que., succeeding H. J. Kay, who has been transferred. R. C. Weller, assistant division engineer at London, Ont., has been promoted to division engineer of the Horne Payne division, with headquarters at Horne Payne, Ont., succeeding A. E. Sibbick, transferred.

**MILWAUKEE**—B. J. Worley, principal assistant engineer, Chicago, appointed assistant chief engineer signals and communications there. His successor is W. E. Fuhr, division engineer, Dubuque and Illinois division, Savanna, Ill., who in turn is replaced by E. C. Jordan, division engineer, Minneapolis.

**MISSOURI PACIFIC**—P. D. Tracy, assistant division engineer at Kansas City, Mo., has been named division engineer at Coffeyville, Kan., succeeding G. S. Smith, retired. D. J. Bertel has been named to replace Mr. Tracy.

**NEW YORK CENTRAL**—Paul P. Martin, superintendent of maintenance equipment at Cleveland, Ohio, has been named methods engineer—system, at Cleveland. John W. Mueller, chief clerk in the maintenance of way department at Jackson, Mich., has been promoted to superintendent maintenance of way shop, at Jackson, succeeding Max E. Kerns, who has been appointed superintendent of maintenance equipment at Jackson.

Max Nearing, assistant engineer of con-

struction, has been promoted to engineer of construction at Chicago. Joseph Leone and Thomas A. Scott, section foremen at Indianapolis, Ind., have been promoted to supervisors of track on the Indiana division. B. J. Murphy has been appointed assistant division engineer on the Ohio Central division with headquarters at Columbus, Ohio.

**NORFOLK & WESTERN**—C. G. Hammond, Jr., assistant trainmaster and formerly roadmaster, has been promoted to assistant superintendent of the Radford division.

**NORFOLK SOUTHERN**—John A. White, Jr., assistant engineer, has been promoted to construction engineer with headquarters as before at Norfolk, Va.

**ST. LOUIS-SAN FRANCISCO**—D. C. Gement, has been appointed assistant roadmaster on the Northern division, with headquarters at Ft. Scott, Kan.

**SEABOARD AIR LINE**—J. C. Britt, student engineer at Raleigh, N. C., has been promoted to assistant to the division engineer at Savannah, Ga. Howard Watts, Jr., assistant division engineer at Americus, Ga., has been named structural designer, with headquarters at Norfolk, Va.

## SUPPLIERS

**AUSTIN - WESTERN WORKS**—Elmer H. Fredrickson, assistant manager—export department, has been named export sales manager of the firm which is part of the Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, succeeding Chester Cotten, retired. William J. Gelb, formerly branch manager for the J. I. Case Company in the Argentine, has been named district export sales representative to direct sales activities in the Canadian territory. He will also function as export liaison with headquarters in the New York area.

**DUFF-NORTON COMPANY**—T. W. Krueger, sales manager of the firm's jack division, has been named sales manager for the company.

**FAIRBANKS, MORSE & CO.**—C. E. Marion, manager of the Oakland, Calif., scale man-

ufacturing operations, has been appointed manager of the San Francisco branch scale department, succeeding A. B. Parker, who has been named sales manager, mechanical sales, of the scale division with headquarters at Chicago. Richard Wasniuk, formerly with the Cleveland branch of the company, has been promoted to manager of scale service, scale division, for the Chicago corporation.

**L. B. FOSTER COMPANY**—Raymond J. Warren, formerly associated with the Bethlehem Steel Company, has joined the sales staff of the Chicago office. His sales territory includes Indiana, Michigan and Missouri.

**HYSTER CO.**—Robert F. Moody, eastern division sales manager of industrial trucks, has been appointed domestic sales manager in charge of all industrial truck sales activity in the United States, Hawaii, Alaska and Canada. Raymond L. Howerton, assistant sales promotion manager, has been named sales promotion manager at Portland, Ore. Ray M. Ronald, western division sales manager, has been named domestic sales manager of the firm's tractor equipment division.

**NATIONAL LOCK WASHER**—Jack A. Liddell, assistant to the president, has been named vice-president in charge of sales and market research at Newark, N. J. Harold W. Fairweather, assistant treasurer, has been appointed executive vice-president.

**SOUTHEASTERN RAILWAY SUPPLY, INC.**—W. Conroy Wilson, former vice-president  
(Continued on page 63)



William J. Gelb  
(Austin-Western Works)



E. H. Fredrickson  
(Austin-Western Works)



Robert F. Moody  
(Hyster Co.)



R. L. Howerton  
(Hyster Co.)



Ray M. Ronald  
(Hyster Co.)



T. W. Krueger  
(Duff-Norton)



Jack A. Liddell  
(Nat. Lock Washer)



H. W. Fairweather  
(Nat. Lock Washer)



CONCENTRATED BORASCU

## Your old-fashioned scalping cuts more profits than weeds!

Clearing weeds by shovel-cutting, with today's high cost of labor, is downright extravagant! Borate weed killers can do a much better job of weed control for a small fraction of what hand-scalping is now costing you.

Countless dollars have been saved on weed control by roads using our borate weed killers since we first pioneered their development. They are effective against weeds and grasses for long periods... easy to apply... and safe to use wherever vegetation is unwanted. Today we offer a choice of several proven herbicidal formulations—each with special characteristics and advantages—to meet your particular requirements.

Start your labor-saving weed control program now. Talk to one of our technically-trained salesmen. He will be glad to recommend and demonstrate the right weed killer for you. Write today for literature or to arrange a meeting.



**United States Borax & Chemical Corporation**  
PACIFIC COAST BORAX COMPANY DIVISION  
630 SHATTO PLACE • LOS ANGELES 5, CALIFORNIA

Concentrated BORASCU® • UREABOR® • POLYBOR-CHLORATE® • MONOBOR-CHLORATE®





## CUT MAINTENANCE COSTS

**BUILT OF BLACK GUM  
TO LAST AND LAST!**

### GREATER STRENGTH . . .

The interlocking grain of this toughest of hardwoods ruggedly resists heavy, pounding vehicular and railroad traffic. Slabs now securely tied together with four through-bolts, also lock nuts that won't back off.

### LONGER DURABILITY . . .

No heaving or spalling due to freezing and thawing, no potholes from heavy impact. Many Moss Crossings giving smooth, trouble-free service after 15 and more years.

### MORE VERSATILITY . . .

Tailored to your specifications to fit any angle or curve, single or multiple track; no cutting or fitting on the job. Sectional construction makes installation simple and quick, relocation easy.

### GREATER ECONOMY . . .

All this adds up to maximum satisfaction at minimum cost . . . no big capital expenditure, and minimum annual maintenance.



**T. J. MOSS** TIE COMPANY

700 SECURITY BLDG. • ST. LOUIS 2, MO.

CROSS TIES • SWITCH TIES • POLES & POSTS

PILING and CROSSINGS

WOOD PRESERVING PLANTS: E. St. Louis, Ill.

Granville, Wis. • Shreveport, La. • Columbus, Miss.

For the Smoothest  
Paved Areas Over  
Railroad Tracks . . .

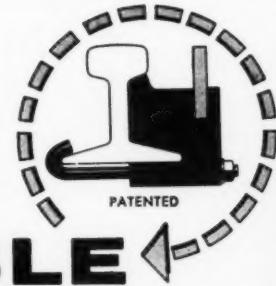
## Use **KASLE** IMPROVED “Guardmaster” FLANGEWAY CROSSING GUARD

Smooth Durable Crossings—Low installation  
and Maintenance Cost.

Write today for Brochure.

### TRACKWORK of ALL KINDS

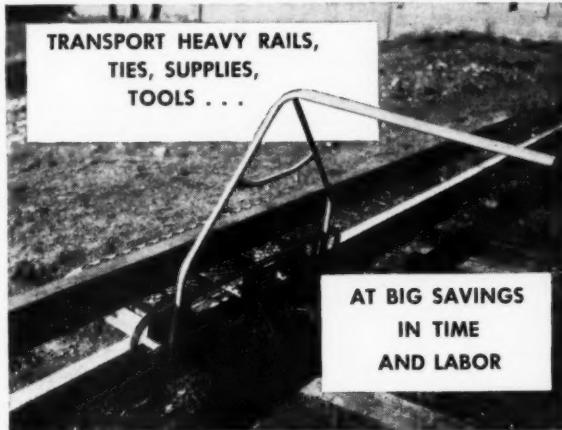
Rails of all sizes, Splice Bars, Bolts, Spikes, Tie Plates, Frog and Switch Materials, Tools, etc.  
Railroad Track Material inquiries invited.



**KASLE  
STEEL CORP.**

P.O. Box 536 Detroit 32, Michigan

Tiffany - 6-4200



## with the **NOLAN** TRACK DOLLY!

Well-balanced . . . strong and serviceable . . . 1500 lbs. capacity . . . easy-rolling roller bearings . . . the NOLAN Track Dolly can keep things moving fast, easily, and economically.

Built of tubular high-carbon steel, operator's handle conveniently placed for full control. Inspector's model has a detachable handle to permit carrying the entire unit in a truck or car.

STANDARD DOLLY — Price \$85.50

Length 50½" — Width 15½" — Ht. above rail

6¾" — Wt. 88 lb.

INSPECTOR'S DOLLY — Price \$84.50

Length 36" — Width 14" — Ht. above rail 6"

Wt. 60 lb.

Send your order now!

Write for complete catalog of Nolan railroad equipment and supplies



**THE NOLAN COMPANY**

166 Pennsylvania Street, BOWERSTON, OHIO

RAILWAY TRACK and STRUCTURES

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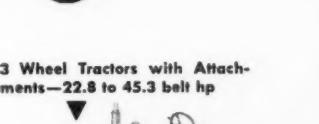
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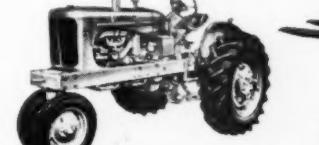
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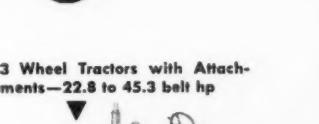
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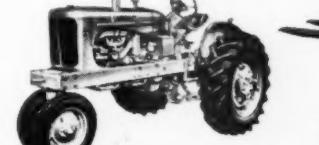
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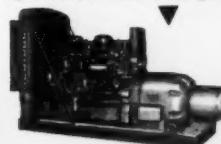
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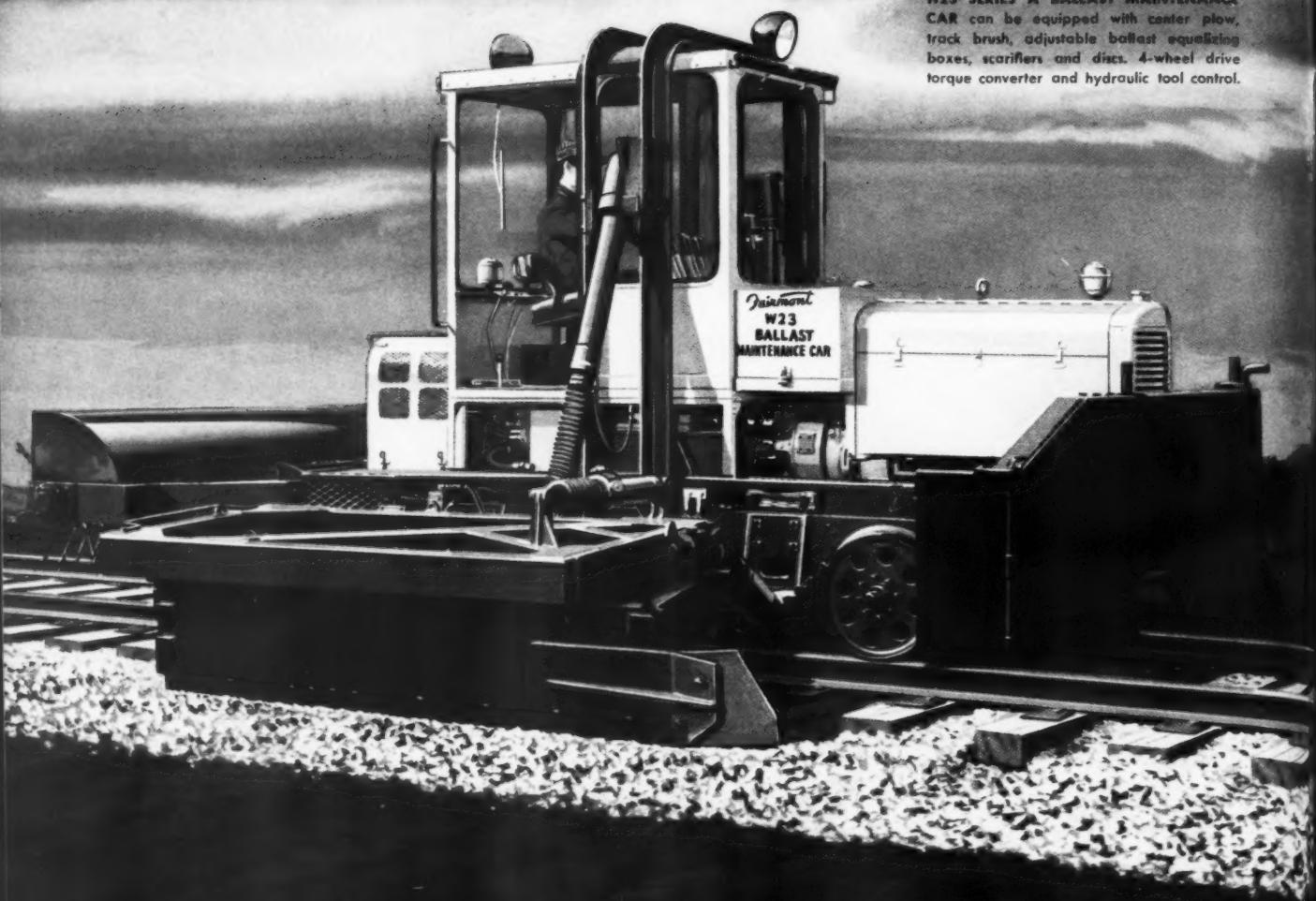
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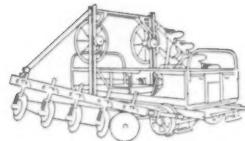
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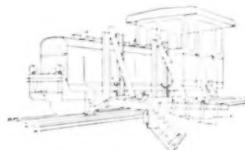
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MAINTENANCE**

*... think first of* **Fairmont**

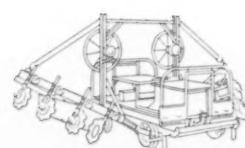
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Economical maintenance of track ballast demands the use of the most productive and time-saving machines. That is why more and more supervisors are using the Fairmont equipment shown on this page. These units are well able to perform a wide variety of necessary jobs in the shortest possible time. To obtain greater speed and efficiency . . . easy, thorough operation . . . and economical, sturdy equipment for your ballast maintenance operations, call on Fairmont.

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RAILWAY

# TRACK and STRUCTURES

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## DON'T MISS . . .

Aiming at higher standards and increased efficiency, the Richmond, Fredericksburg and Potomac has completely revamped its track-maintenance forces in recent years. Three

articles in the August issue tell the complete story: Why the reorganization was undertaken and what it has meant in the way of changes in manpower and mechanization.

. . . in the August issue

# NOW ON-TRACK... with an AUSTIN-WESTERN



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With the addition of retractable guide wheels, the versatile self-propelled Austin-Western Hydraulic Crane becomes the most flexible *on-track off-track* tool available to the railroad industry.

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The Rail Crane Attachment can be furnished as standard equipment or as an optional field installation.

For all the facts send the coupon below now.



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COTTON BELT:

Tank car of sulphuric acid on  
trestle over Trinity river.  
(United Press Telephoto)



SANTA FE:

Here it's an automobile straddling track on  
trestle near Lampasas, Tex.  
(United Press Photo)

(Turn page for story and more pictures)



MOPAC:

Three 60-ft steel spans were lost from bridge  
across Walnut river near Winfield, Kan.



ROCK ISLAND:

Forces repairing washout near Dover, Okla., use  
crawler tractors to shift track.



FRISCO:

Crane removes debris piled against  
Arkansas River bridge.

RAILWAY

## TRACK and STRUCTURES

# Nature wages war

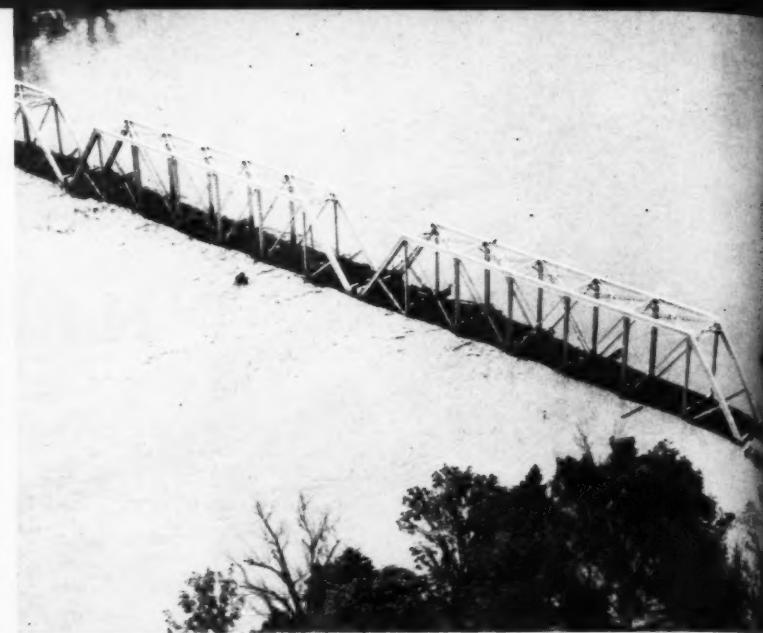
against RRs in the Southwest

Beginning late in April and continuing intermittently for a month or more, heavy rainfall in the southwestern states caused heavy damage to railroad property. The Trinity, the Cimarron, the Brazos, the Arkansas, the Red and many lesser streams rose out of their banks to smite tracks and bridges. Meanwhile, tornados were flattening depots and other railroad buildings.

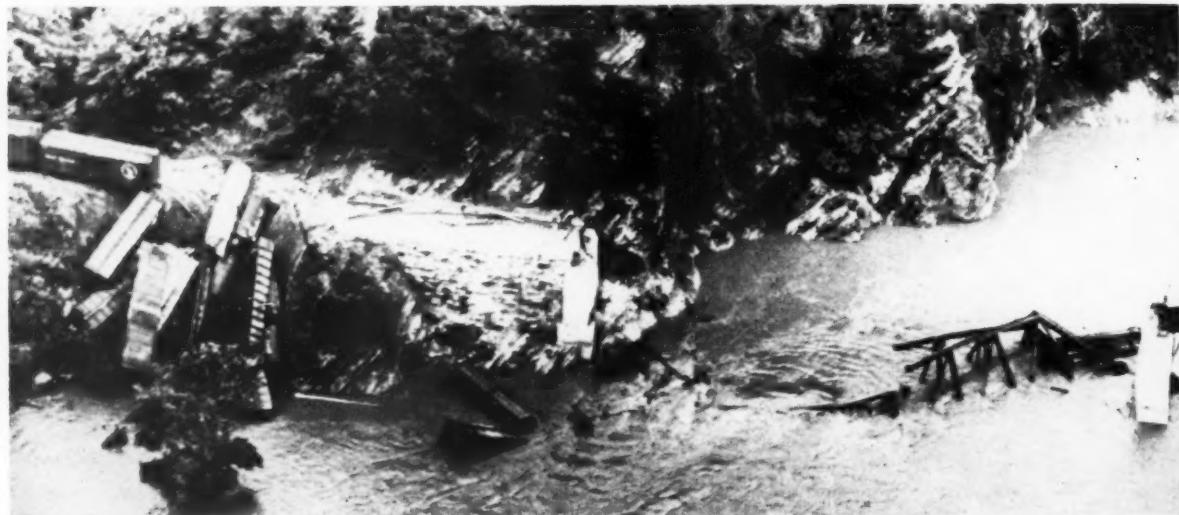
## Water was No. 1 enemy...



NIGHTMARE for bridge engineers was presented by debris-choked streams like this.



DEBRIS was beginning to pile up against the Frisco's bridge across the Cimarron, 18 miles from Tulsa, Okla., as this view was taken.



WASHOUT of Santa Fe bridge across Washita river in Oklahoma took with it 20 cars of a 70-car freight train.

### **NATURE WAGES WAR**

## Floods, tornados hit RRs hard

• It all started on or about April 27 when 3 in. of rain fell around Encinal, Tex., some 40 miles north of Laredo, and washed out Missouri Pacific tracks both ahead of and behind the Texas Eagle. The same day the Texas & Pacific reported train delays of several hours due to high water over tracks at Jefferson in east Texas. The following day—April 28—every major river in Texas was at or near flood stage. It had been raining for 10 days.

Hardest hit in the Southwest were the Santa Fe and Frisco lines. Others,

including the Rock Island, M-K-T, Missouri Pacific, T&P, Cotton Belt, Ft. Worth & Denver, and Midland Valley, were hit hard too. In Oklahoma, the Cimarron river was generally considered to be the worst offender. At Dover, the flood washed out the approaches to the Rock Island's bridge. Meanwhile, the Frisco lost 28 panels of bridge over the Cimarron between Ames, Okla., and Okeene. On May 20, this road's line from Beaumont, Tex., to Enid, Okla., was out in as many as 20 separate locations.

The Frisco suffered the "total destruction" of its depot at Fremont, Mo., in a tornado. The Frisco bridge across the Red River between Davidson, Okla., and Vernon, Tex., was totally washed out, and washouts also occurred between Okmulgee, Okla., and Muskogee and on the Little Black river between Poplar Bluff, Mo., and Hoxie, Ark., resulting in two- to three-day delays to service.

Washouts hampered traffic on the Santa Fe at many locations in Oklahoma and Texas. The road's Cimarron river bridge at Yale, Okla., was out of service for several weeks as one pier, undermined by flood waters, settled  $9\frac{1}{2}$  in. Washouts disabled several lines of the Santa Fe in the vicinity of the Cimarron river



WORKERS are protected by newly constructed dike as they undertake repair of a washout on the Rock Island near Zyba, Okla.

## ...with wind rated No. 2



TORNADOS joined in the destruction. Here is wreckage of the MP's depot at Martin City, Mo.



DERAILED cars were mute witnesses to washout on Rock Island near Dover, Okla.

between Guthrie, Okla., Enid and Stillwater and between Waynoka and Buffalo. The most serious flood damage on this road occurred on June 2 when its bridge across the Washita river between Dougherty, Okla., and Gene Autry was washed out.

The Fort Worth & Denver reported that during May it had two bridges washed out, four others damaged, and some roadbed washed away. The road's bridge across the Brazos river on the Stamford-Spur line was washed out and the span over the Pease river was "partially out" between Estelline, Tex., and Sterly.

A devastating tornado which swept through the outskirts of Kansas City on May 20 toppled the Mis-

souri Pacific's 16-ft by 40-ft depot, overturned several box cars and destroyed a grain elevator and section and tool houses.

A spokesman for the MP reported that, "while heavy rainfall and consequent flow caused the damage in most cases, in at least two instances secondary causes were also to blame. At Fort Gibson, Okla., (near Muskogee), the dam across the Grand river piled up water to such an extent that government engineers opened the flood gates for maximum discharge of the impounded water, and the resulting flood washed out our tracks and service was interrupted for a few days. At Corwin, Kan., a bridge was knocked out of line when a 40-ft highway bridge, washed out upstream from the railroad struc-

### And still the rains came . . .

. . . but the front shifted to other parts. About the middle of June, while the flood-stricken areas of the Southwest were enjoying a breather, reports of flood damage began coming in from two other areas—St. Louis and vicinity and western Minnesota and eastern South Dakota.

The Mopac's St. Louis-Kansas City line went out of service at midnight June 14, but its line from St. Louis to Southwest points was even harder hit, with 47 washouts reported in a seven-mile stretch. The Frisco also suffered washouts in the same general vicinity.

In the other new trouble zone far to the north, high waters hit the Milwaukee Road at two main points—Sioux Falls, S. D., and near Appleton, Minn. Track damage was reported by the Great Northern south and West of Willmar, Minn., and the M&St.L suffered two washouts.

ture, was flung against it by the force of flood waters."

At Winfield, Kan., the MP's bridge over the Walnut river went out. Three 60-ft steel spans were lost and two concrete supporting piers were turned over. Also in Kansas, near El Dorado, a 12-panel MP trestle over Bird creek lost seven of its timber panels.

The Cotton Belt announced that its trestle and portions of roadbed near Lavon, Tex., were "partially washed out" when U. S. Engineers opened the flood gates of a dam.

# New tools for trestle work

Hoisting and jacking  
equipment simplify  
lifting and  
cap-renewal jobs

- You're a bridge man, and you realize the need for equipment that will take the drudgery out of some of the operations involved in repairing timber trestles.

Two new types of equipment recently developed on one railroad may be just what you need. They are:

(1) A rubber-tired 5-ton hoist equipped with retractable flanged wheels so that it becomes a highly maneuverable machine that can be operated on or off the track. This machine has been found to be particularly effective when used for handling caps, stringers and other heavy members.

(2) Special equipment for jacking up the decks of timber trestles to permit renewal of the caps.

The bridge hoist is an Austin-Western machine which is operated completely by hydraulic controls. It has a telescopic boom which may be extended to a length of 37 ft. The boom operates through 360 deg. This machine has a four-wheel drive, and both front and rear wheels are steerable. Hydraulic out-riggers provide a firm base for heavy lifting with a maximum capacity of five tons.

## How the caps in a ballast deck trestle



OPERATING from the ground the hoist is being used to place the jacking beam.

A number of changes were made in the hoist in adapting it to the railroad's requirements. One of these was the addition of the retractable flanged wheels. To operate the machine on the track it is maneuvered into position, with the rubber tires straddling the track, and the flanged guide wheels are lowered onto the rails.

Another change made in the machine was the addition of a second hoisting line. The primary purpose was to give the machine greater flexibility when making repairs over water.

### Jacks for cap renewal

The special jacking equipment has proved to be an important factor in facilitating the renewal of caps. The principal elements of this equipment are:

(1) A jacking beam consisting of an 8-in H-beam with self-contained hangers for attaching it to the deck members. As explained later, there are differences in the jacking beams for use on open-deck and ballast-deck trestles.

(2) Thirty-ton hydraulic jacks. The top or head of each jack is equipped with a set of double rollers, which operate on the bottom flanges of the jacking beam, thereby permitting the jacks to be moved easily into position mono-rail fashion. For each jack there is a jacking base with a curved surface to fit the contour of

the pile. The base is attached to the pile by two eye-bar clamps and a wedge placed against the back side of the pile.

(3) Prefabricated scaffolding for use when jacking up bridge decks or doing similar work. The scaffolding is made of pipe and heavy wire mesh, and is tested for a load of 1000 lb. It is hung from the bridge deck by chains or hooks.

### How jacks are used

Using this equipment here's how a cap is renewed on an open-deck bridge:

With the aid of the bridge hoist, the jacking beam is hung under the stringers adjacent to the cap to be removed. The scaffolding is then hung in place on either side of the bent. The drift bolts are pulled and bracing removed, if required. One 30-ton hydraulic jack is placed on the bottom flange at either end of the jacking beam and is rolled into place, each jack against a plumb pile. The jacks are attached to the piles by the eye-bolt clamps and wedges. After the jacks are in place, the stringers are jacked free of the cap, and the bridge hoist removes the old cap and places the new one. The jacks are then lowered, the drift bolts are re-driven, the braces replaced where removed, and the jacking equipment and scaffolding removed from the trestle.

For use when renewing caps on

## were renewed with the hoist and the other special equipment



JACKS are in position for lifting stringers from cap. These jacks are hydraulic cylinders operated from a central plant.

ballast - deck trestles, the jacking beam is of sufficient length to be hung on the underside of the structure by hangers bearing on the top of the ballast guards. The hinged hanger on one end of the beam is stationary; the hinged hanger on the other end of the jacking beam is movable and is secured laterally by a push-and-pull jack which is an integral part of the jacking beam.

### Central plant for jacks

Four of the 30-ton jacks are used on ballast-deck trestles. They are placed on the lower flanges of the jacking beam, rolled into place and secured to the plumb piles. The trestle is then jacked up. Since the cap rises with the floor stringers, the pile drifts are sawed apart, the cap is wedged from the floor stringers and all other drift bolts are then sawed in two. The bridge hoist is then used to remove the old cap and to place the new one. The jacks are then let off and required drifting is performed from the bottom of the structure.

In the first jacking outfits that were developed for this purpose the hydraulic jacks were individually operated. In the future, however, there will be a central plant from which all the jacks in a set-up will be controlled. Also, jacking outfits acquired in the future will consist of special 30-ton hydraulic cylinders instead of conventional jacks.

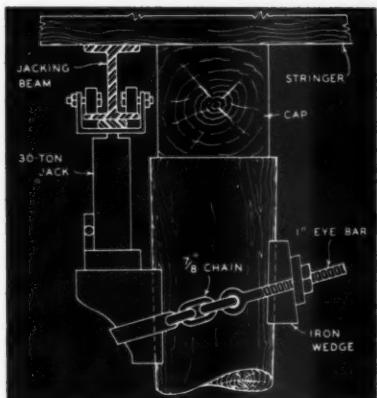
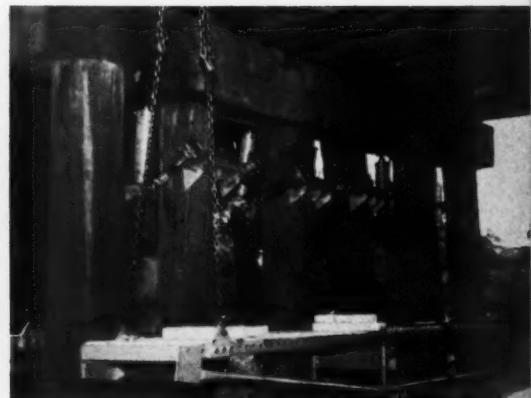


DIAGRAM of jacking arrangement and (right) back side of bent showing how jack supports are fastened to piles. Note prefabricated staging.



BRIDGE HOIST has several special features including retractable flanged wheels and a second hoisting line. It is operated completely by hydraulic controls.

# Ties are p



RACK where ties are pre-plated consists of 300-ft length of track that serves as a template for plating operation. Template rails are supported by widely spaced ties on skid rails on which ties rest while tie plates are applied. Tie plates are applied over pads and are each fastened with two hold-down spikes.

## Here's how the plates are applied...



1 Crossties to be plated are "loaded" into rack by inserting them under template rails until the line end bears against timber stop.



2 Tie pads are placed on ties alongside template rails. Use of pads is now standard on this road.



5 Holes for hold-down spikes and line spikes are bored by Nordberg Tie Drill. Two machines are used, one for each rail.



6 Hold-down spikes are set by hand, two in each plate. Use of hold-down spikes is another new standard.

# pre-plated by transit system

## Practice made possible by adoption of hold-down spikes as standard

lager, superintendent of track and structures, because it is thus possible to do the work under ideal conditions. The cost is much less than if the tie plates were applied in track.

The NYRTS has about 441 miles of track underground, 285 miles on elevated structures, and 135 miles in yards. This year its tie-renewal program calls for the insertion of about 150,000 crossties, of which about 120,000 will be pre-plated. These are mostly ties that will be inserted in connection with out-of-face track-conditioning operations on the subway lines, although some of them will

go into the elevated structure. Ties to be inserted in spot renewals will continue to be plated when inserted.

At about the time pre-plating was adopted the NYRTS put into effect a number of changes in its crosstie practices. To a considerable extent these were motivated by a desire to minimize the plate-cutting of ties. For one thing, it is now using a 14-in double-shoulder tie plate in place of the 10-in single-shoulder plate formerly used. For another, all new crossties are now protected by tie pads, and each tie plate is fastened with two hold-down spikes. The latter are or-

dinary cut spikes slightly modified so as to eliminate the usual tolerances between the spike shanks and the hole in the tie plate. Service tests made on the NYRTS have reportedly shown that the modified spike is highly effective in fastening tie plates to the ties.

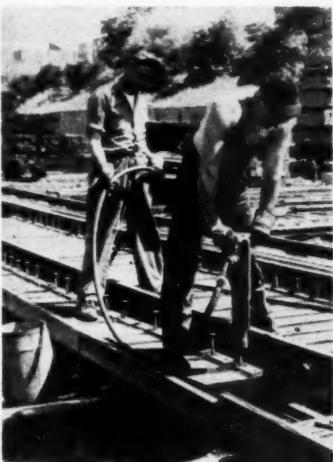
The work of pre-plating ties is carried out at the Thirty-eighth Street yard of the NYRTS in Brooklyn. The pre-plated ties are turned out in a continuous operation by a crew consisting of an assistant foreman and seven men. The photographs below show, step-by-step, how it's done.



3 Tie plates are applied over pads. Double-shoulder, 14-in plates were recently adopted as standard.



4 Plates and pads are shoved under rail while it is held in raised position by man with bar. Pre-plating ties in this manner assures accurate gage.



7 Pneumatic hammer is used to drive the hold-down spikes.



8 Plated ties are pulled out from under template rails and piled in stacks which . . .



9 . . . Are lifted by locomotive crane and placed in stockpiles.

# Seaboard office building put

## This is the lift-slab method

The lift-slab method is known as the Youtz-Slick system of construction and is named after its inventors who placed the patents and responsibility for further development of the system with the Institute in Inventive Research, a non-profit research organization in San Antonio, Tex. Building contractors are licensed to employ this method of construction through Lift Slab, Inc., San Antonio.

### Slabs poured at ground level

Basically, this method consists of pouring a reinforced-concrete floor, and the upper floors and roof slabs one on top of the other at ground level, and then progressively raising them by hydraulic jacks to their final positions, where they are permanently fastened to columns. Although the structural system usually employed consists of concrete slabs and steel columns, other materials may be used, such as concrete columns (precast or poured in place), fabricated steel floors, and wood floor systems and columns.

The equipment required for this method includes a hydraulic pumping unit, a number of hydraulic lifting jacks and a hydraulic control panel.

The slabs are designed by the moment distribution system and the columns by any suitable column formula, keeping in mind that a column is a cantilevered beam until the time when a slab is fastened at the

top of the column. Lifting collars are embedded in each slab at each column location and are considered in the design as a direct shear connector.

### Preliminary steps

The usual procedure for the lift-slab method of building erection is as follows:

After the building site has been cleaned and graded, the footings are placed, followed by the piers, beams, plinths, etc. Any fill required under the ground slab is then placed and properly graded. Some architects and engineers design a structure for raising the ground slab above the ground. This is done to provide crawl space for the construction and subsequent maintenance of ducts for supply-lines which otherwise would require tunnel construction. Where the ground slab will be subjected to heavy loads, beams can be formed at this stage of the work by cutting space for them in the fill.

The column base plates are then set in place on the pedestals and brought to correct elevation with leveling nuts on the anchor bolts. The columns are then erected and carefully plumbed to a vertical position.

The reinforcing steel for the ground-floor slab is placed and tied. Also, any conduits required in this are inserted between the bottom and top mats of reinforcing. Carpenters then construct the side forms for the

The lift-slab method of erecting buildings has caught the attention of architects, engineers and building - construction men throughout the country since the first lift-slab building was constructed in 1950. Offices, commercial buildings, hospitals, prisons and even barracks for the U. S. Navy have been constructed by this method.

Now there's a lift-slab building in railroad service. Impressed by the savings and other advantages

ground-floor slab, which also serve as screeds, and the concrete is poured.

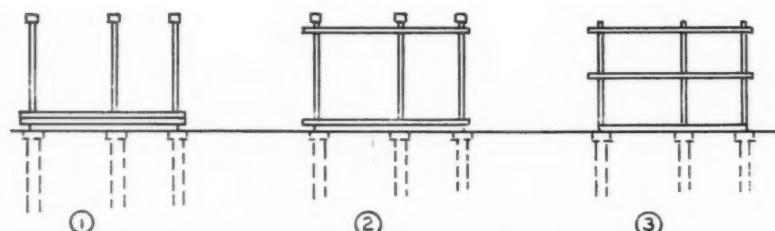
Since the upper surface of the ground slab also serves as the bottom form for the first lift slab, it is important that it be poured and surfaced accurately. The concrete of the ground slab also must be cured properly to prevent any cracks or spalling from taking place, as these will show up in the soffit of the first lift slab.

After at least 18 hr, when the ground-floor slab has taken a firm set, a separating medium having a paraffin or wax base is brushed or sprayed on the upper surface of this slab to prevent the concrete for the first lift slab from sticking or bonding. Care is exercised to be sure that the complete surface is coated.

The first lift slab, which will form the second floor of the building, can now be poured. Lifting collars are placed around each column and the side forms, reinforcing steel, piping, ducts, etc., are placed on top of the ground floor slab and the second floor slab is poured. The same procedure is followed for the other floor slabs and the roof slab.

### How slabs are erected

When all the slabs have been cured for a minimum of 14 days, a



FOOTINGS, piers and grade beams are placed first, after which the columns are erected and carefully plumbed vertical. The ground-floor slab is poured and then, in successive layers over it, the slabs for

the upper floors and roof are poured. Fig. 1 shows work at this stage and with hydraulic jacks mounted on the columns. Roof slab is then raised (2) followed by raising of upper-floor slab (3).

# It up by 'lift-slab' technique

claimed for this type of construction, the Seaboard Air Line adopted it for a new division office building it has erected at Jacksonville, Fla.

On these pages are presented, first, a description of the lift-slab method of construction and, second, an account of how it was used in constructing the office building at Jacksonville. The building went up relatively fast and the railroad expects it will be easy to maintain.

hydraulic jack is placed on the top of each column. Vertical, full-threaded lifting screws are connected to the hydraulic jacks and into threaded bushings set in the lifting collars of the top slab. Each jack is connected by hydraulic hose to a console where hydraulic pressure is supplied by a power unit and where the operator can read the amount of rise at each column. Through valves, the operator controls the amount of rise at each jack so that the slab is raised uniformly.

#### Four to five feet per hour

After an initial raise of about  $\frac{1}{4}$  in., when the top slab is broken loose from the one directly below, measurements are taken at each column and adjustments made to assure that it has reached the same elevation at all points. The lifting operation is then resumed until the slab has reached its design elevation. The rate of lift is from 4 to 5 ft per hr. Steel blocks are then welded to the steel columns immediately below the lifting collars to serve as permanent support for the slab. The vertical lifting screws are then connected to the lifting collars of the next slab to be raised, and the procedure is repeated until all slabs have been raised to their final position and fastened in place.

## This is how the SAL used it

• "We adopted the lift-slab method of erection as an experiment," says J. C. Williams, engineer of buildings for the SAL. "If we can believe all we read and hear, this construction method offers savings in time and labor. We had urgent need for the new division office building at Jacksonville and the sooner it could be built the sooner we could occupy it. We know it won't cost more than the poured-in-place type of construction and we hope it will be less. Also, it should be easy to maintain."

The new office building was built at a cost of about \$1½ million at the corner of McDuff and Warrington streets in Jacksonville in one corner of the road's shop property. It is about 45 ft wide by 262 ft long and has a wing approximately 45 ft wide by 63 ft long. Construction work was begun on July 17, 1956, and the building was occupied on May 18, 1957.

The new building has no basement. On its first floor it houses the road's division traffic, operating, treasury, law, property protection,

purchases and stores and communications and signals departments, in addition to a large assembly room (seating 104 persons), snack room, CTC equipment room and an air-conditioning equipment room. On its second floor are the division operating, accounting, engineering, track and bridge and building departments, as well as space for the CTC machines and dispatchers, mail and duplicating service and file storage. It is entirely air conditioned.

The CTC equipment is housed in the wing and, because of its importance to the operation of the division, a brick fire wall was constructed to isolate it from the remainder of the structure. A stand-by generator adjunct also was provided so that, in the event of a power failure, CTC operation will not be interrupted for long.

#### Features of design

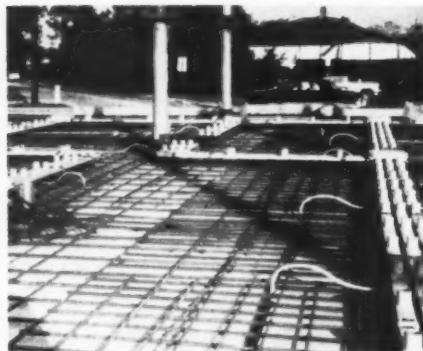
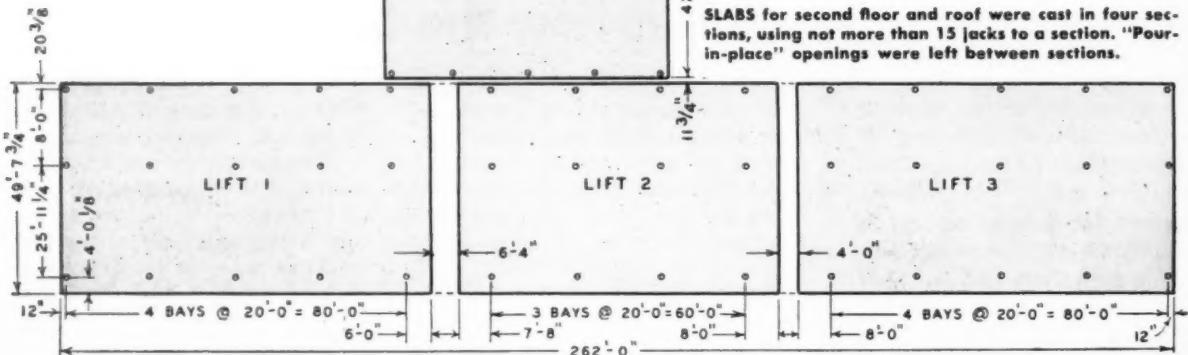
In general, the columns are spaced 20 ft apart in three rows for the length of the main building and the wing. In the main structure the rows

Turn page to see how it was built →



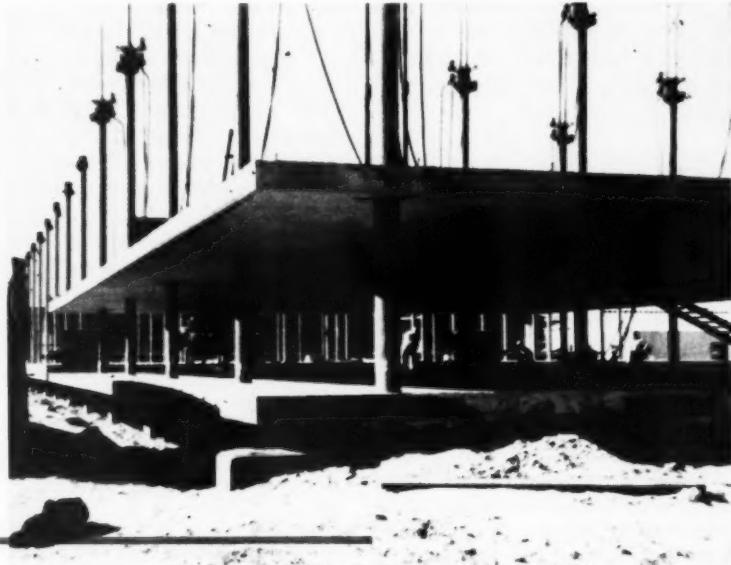
UPPER slabs in finished building project outward from walls to provide shade.

## How the lift-slab technique works



THREE-WAY DUCTS for carrying telephone, electric power and intercom systems were embedded in the floors before pouring concrete.

AFTER an initial raise of  $\frac{1}{4}$  in., measurements are taken to assure that all points are at same level. Lifting is then resumed. Note jacks on columns.



were spaced so as to permit a 6-ft 8-in corridor to extend the full length. The columns are made from 8-in extra-strong steel pipe and are set on concrete piers supported on pile foundations. Grade beams also were constructed in the fill between columns.

In general, the building was constructed in accordance with the Youtz-Slick lift-slab system as outlined in the adjoining columns. The ground-floor slab was cast 5 1/2 in thick and over this a 2 1/2 in topping was applied and carefully surfaced. The column base plates were raised 2 1/2 in above the concrete pedestals and Embeco grout was placed beneath them before any construction loads were placed on the columns.

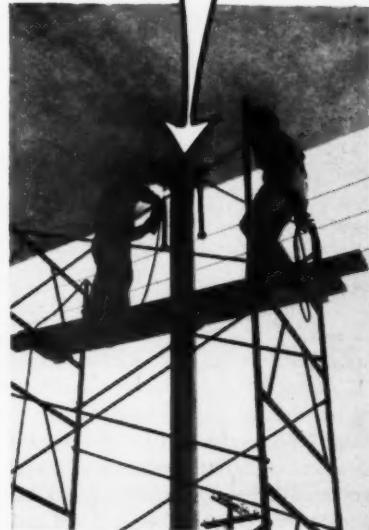
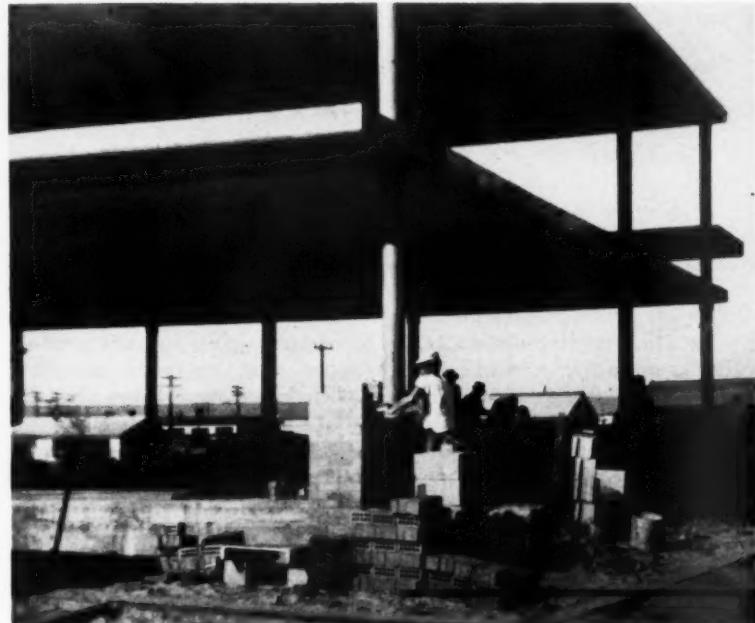
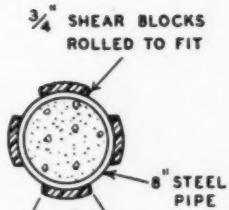
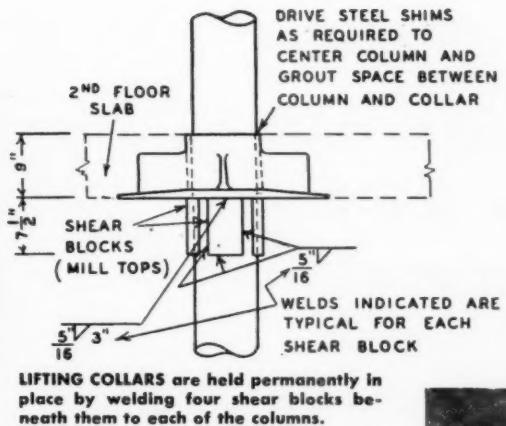
The second-floor slab (the first lift slab to be poured) was made 9 in thick. Galite, a lightweight aggregate, was used in making the concrete for this slab which was designed for a 60-lb live load and a 20-lb partition load. Conventional aggregate was used in the concrete mixtures for both the groundfloor and roof slabs. The roof slab was made 8 1/4 in thick.

### Slabs cast in sections

Because of the large floor area of this building, it was decided to cast the second-floor and roof slabs in four sections, using not more than 15 lifting jacks to a section. This method permitted the men to work continuously on one section after another and also permitted the raising

to be similarly carried out. Openings were left between the sections to completely free them from one another, although the reinforcing steel extended into these strips. When the slabs were raised to their final positions, the strips or openings between slabs were closed by setting up forms and pouring them in place. Also, all columns were then filled with concrete.

After being raised to its final position each slab was fastened permanently in place by welding four shear blocks to each column under the lifting collars. These shear blocks were rounded to the same curvature as the columns. The collars also were centered at each column by driving steel shims between the collar open-



COLUMNS are encased and exterior walls erected. Being non-loadbearing, interior walls could be moved, if necessary.

ings and the columns as required.

Three-way ducts, for carrying telephone, electric power and intercommunication systems, were embedded in the floors at the time the reinforcing steel was placed.

Air-conditioning ducts were installed in the corridors and hidden by lowering the ceilings. The outlets from these ducts were located opposite the windows in the exterior walls so that room partitions could be moved as desired without interference. A cooling tower for the air-conditioning system was constructed above roof level. Heat distribution is made through the same ducts used for air conditioning, and the heat is obtained from steam supplied by the shop plant.

The second-floor and roof slabs were extended outward from the exterior walls to provide shade from the sun. The non-loadbearing exterior walls are of brick and the column pilasters are trimmed with Indiana limestone. On the interior, the columns are encased and plastered. Windows are of aluminum and are vented inward at the bottom panels.

#### Requires more detail plans

In commenting on this method of erection, Mr. Williams said; "It requires a lot of work in designing such a structure, as the lifting stresses also must be given consideration. The building department at Jacksonville

has one of the most rigid building codes to be found along our railroad. Before we received approval of the design and obtained a permit to proceed, we submitted almost 300 sheets of design details which they carefully checked."

The structure was constructed by Paul Smith Construction Co., Inc., Jacksonville, Fla., and the slab lifting was done by Southeastern Lift Slab, Inc., of Atlanta, Ga., which is licensed by Lift-Slab, Inc., to use this method of construction. It is designed under the general direction of W. D. Simpson, chief engineer of the SAL and under the direct supervision of J. C. Williams, engineer of buildings. The former office building was sold to Sears, Roebuck & Co.

## What are they saying about . . .

### ● Continuous rail? ● "Frozen" joints? ● Conventional joints?

**WHO? The four panelists pictured on these pages who spoke recently before the Metropolitan Maintenance of Way Club of New York, on the topic: "Welded Rail vs. Conventional Rail."**

● *What's the future of conventional joints?* The consensus of opinion among the panelists seemed to be that conventional jointed rail has and will continue to have a prominent place in many locations such as unballasted main lines, secondary tracks, yards and branch lines.

Any transition to other types of construction for mainline, high-speed tracks will, of necessity, be a slow and gradual process. However, labor costs, now high and still rising, are leading many M/W men into seriously investigating ways to circumvent present-day costs of joint maintenance. K. E. Dunn, assistant engineer maintenance of way—system, New York Central, seemed to voice the consensus of the panelists' opinions when he said he believed ". . . that conventional joints, as we know them now, will ultimately be eliminated by either tight rail, or . . . welded rail."

*What about tight or "frozen"-joint rail?* What are its advantages? According to W. M. S. Dunn, staff engineer of the Chesapeake & Ohio, the major advantage may well be the reduced cost of handling as compared with continuous rail and the lower cost of maintenance as compared with conventional track. Accord-

ingly, Mr. Dunn points out, the C&O decided to make four one-mile test installations of "tight rail" on some of their heavier tonnage tracks last year. The thinking was that the road "might well expect to gain the benefits of continuous welded rail at a materially reduced cost."

"It is entirely too early," said Mr. Dunn, "to make any definite statements as to the final results which we hope to obtain from the installations. However, we can truthfully say at this time that the rail in most cases appears to be holding and the joints 'frozen.' The advantages which we anticipate accruing from this type installation will be in reduced joint maintenance, prolonged life of the rail, better riding track, the reduced track smoothing and surfacing work required and the lessened fouling of ballast which is caused by vertical pumping and in many cases poor joint conditions."

K. E. Dunn pointed out that frozen-joint rail in preference to continuous rail is more likely to gain in popularity in the eastern part of the country. "Factors in making the handling of long rails less attractive to eastern roads (in densely populated areas) are the number of pub-



**W. M. S. DUNN (C&O):** Using frozen-joint rail, we "might well expect to gain the benefits of continuous welded rail at a materially reduced cost."



**J. E. EISEMANN (AT&SF):** ". . . this welding of existing older rail may well prove economical when it is to be re-laid in secondary main track. . . ."

lic and private road crossings which require trenching when unloading rails to place them below roadway surface prior to laying." Mr. Dunn went on to say ". . . insulated joints are very prevalent in eastern territory at protected crossings, switches, etc., which necessarily requires that the long lengths be subjected to frequent cuts.

"The frozen joint, or tight-rail construction," he said, "is going to seriously compete with welded rail because of its economic attractiveness in eliminating the labor of handling and rehandling long welded lengths."

*What are the objections to frozen joints?* J. E. Eisemann, district engineer of the Santa Fe, came right to the point in expressing a preference for continuous welded rail over frozen-joint rail when he said: "While it would be possible to freeze joints and apparently accomplish welded rail conditions, the freezing of joints would not be the final answer." Mr. Eisemann expressed the opinion that a new design of joint bar would have to be developed to attain maximum effectiveness in frozen joints. One would have to place bolts of adequate tensile strength and then, he said, ". . . be



K. E. DUNN (NYC): ". . . Conventional joints as we know them now, will ultimately be eliminated by either tight rail, or . . . welded rail."



J. C. DE JARRETTE, JR. (RF&P): ". . . do not under-rate the value of continuous welded rail. . . I believe it is a big step in the direction of progress."

faced with added maintenance to be certain the bolts were always in proper tension." He went on to point out that "complete and total elimination of rail end batter could never be obtained unless the rail ends had been sawed perfectly square. . . ."

*Will welded rail continue to gain?* Speaking in behalf of continuous welded rail, along with Mr. Eisemann, J. C. DeJarnette, Jr., chief engineer of the Richmond, Fredericksburg & Potomac, pointed to some of the needs which still exist in the field of butt-welding rail. One of the greatest needs today, he said, "is competition in methods of welding to help reduce costs and to help small railroads get started in a welded rail program." Mr. DeJarnette went on to note that, in his opinion: "A most important point of success in continuous welded rail is to apply sufficient anchors and ballast to meet local conditions. . . ." He pointed out that the RF&P used the AREA recommended anchoring for two-direction traffic on continuous welded rail.

In describing what the Santa Fe has done, Mr. Eisemann said that "we have so far only dampened our toes with our 661 miles. We do have, in years to come, a potential total of

3,971 main track-miles where we will ultimately lay new 136-lb welded rail, 3,083 main track-miles where welded new 119-lb rail will be laid and 7,498 main track-miles suitable for consideration as locations where a relayer class of welded rail can be used or where, for the sake of the inherent economies of welded rail, the old rail in track can be welded, either in track, if that manner of handling proves most economical, or through removal, welding and relaying back in track.

"It is very possible that this welding of existing older rail may well prove economical when it is to be relaid in a secondary main track where the possibilities for proper and adequate maintenance are lessening as a result of increased labor costs. The possible economies for such work in the future may not be what they were a few years ago or even today, but to even start to maintain this secondary track properly with the arbitrary amount of help we will have available for this less important trackage, may be one of the few ways we will have of solving the maintenance problem."

In speaking of costs of welded rail, Mr. Eisemann stated: "It would be difficult to relate the costs per weld during the earlier years of welded rail with the costs of today, but, even with increased labor and material costs in the last ten years, the present-day cost of welding two rails together has still been reduced to an average of 60 per cent of the cost experienced ten years ago. And with improved techniques, greater speed and a more automatic operation, it is estimated that this cost can, within the next two or three years, be further reduced to a point where it will amount to 25 per cent to 30 per cent of the cost for performing the same job in 1947."

"The costs per weld at present are somewhat under the cost for a joint complete. This comparison is only proper when all units of a joint installation are considered, including labor for application, bolts, washers, bars, initial grease, rail bonds, retightening as required and lubrication during their life. Based on the foregoing, our present cost for a 136-lb joint would be \$15.70 each."

"Building up rail ends, the application of reformed bars, if done, and

interest on the investment are not included in that figure. The comparison is still a just one as the cost of the last-mentioned three items would more than cover any added maintenance of welded rail such as straightening welds, if required, field grinding of welds, if necessary, plus adding of occasional pieces of rail if and when required."

#### *How long should welded rail be?*

"There does not seem to be any hard and fast rule to quote as regards the maximum length, or minimum length of a welded rail," said Mr. Eisemann. "In our initial test section, an effort was made to determine this through laying varying lengths between 500 ft and 1440 ft. Impossible problems existed with neither extreme and for the sake of economy in joints, plus the fact that it was a reasonable length to handle, all conditions considered, we established a 1440-ft length as a basic unit. Other roads have welded strings of greater and lesser lengths."

He pointed out that, "in a seven-year comparison made of actual labor costs of a five-mile test section as opposed to a similar section of jointed track, laid at the same time, and immediately adjacent and parallel to the welded rail, with traffic density over the welded rail being approximately 10 per cent greater, a labor reduction averaging 1,123 hours per year, or about 20 per cent, was obtained on the welded rail section. . . ."

"The anticipated added life of welded rail," he said, "now estimated to be almost 20 per cent greater than jointed rail, is another factor of considerable proportion. The intangible, but nevertheless real, savings in wear and tear of equipment through maximum elimination of joints is another important factor. Added tie life, while somewhat less in money savings, also looms as a very real economy. The increase of lengths of surfacing cycles amounts to a very tangible saving. Generally, one can look at any part of the track structure or track maintenance organization and find positive and quite real economies where welded rail is laid. It is our firm opinion that the practice of welding rail will grow and, while very worthwhile economies have thus far been obtained, greater economies are real possibilities in the future."



**GRADALL** lays rails for new yard track on the Elgin, Joliet & Eastern. For this purpose a special rail-tong attachment is used which has three steel fingers that grasp the rail with a scissors action. Hydraulic controls are used.



**ENROLLEES** in the Baltimore & Ohio's course for training engineering graduates get pointers on track from J. K. Lindsay, division engineer. During two-year course trainees get experience in all departments and intensive training in one.

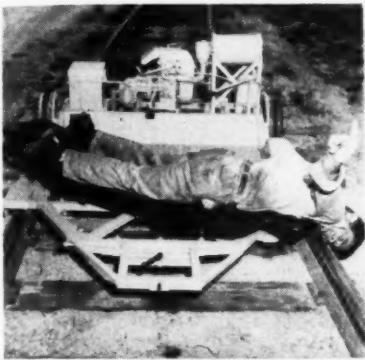


**NEW STATION** for local passenger trains only was placed in service at Pittsburgh, Pa., on June 15 by the B&O. The facility replaces the road's 68-year-old Smithfield Street station which must be removed to make way for the Penn-Lincoln Parkway improvement. Constructed of Indiana limestone the station exterior features large areas of glass in the facade over the main entrance. Inside, the waiting room walls are finished to a height of 10 ft with a delicate green terra cotta, with plaster above. The floor is a reddish-brown Terrazzo in two-tone colors. The ceiling is acoustically treated.



**LARGE YARD** serves as backdrop for International TD-18 bulldozer as it works on a site-improvement project for the Norfolk & Western. Owned by the railroad the unit is helping to clear about 150 acres of scrub pine trees to reduce the fire hazard.

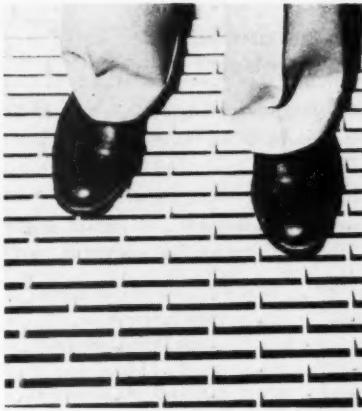
# Products



*High rigidity . . .*

## Aluminum grating

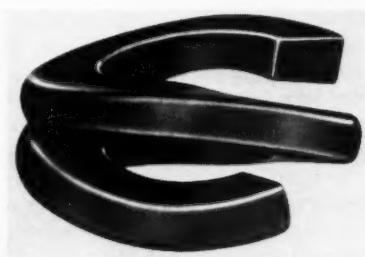
THE combined advantages of a rectangular opening and riveted gratings are retained in a new railroad-type grating made of aluminum. It is claimed that the grating remains structurally rigid regardless of the cutouts located in any part of the panel. The design of this grating leaves a 79-per cent clear opening which the manufacturer states is easy to keep clean and free of accumulations of dirt, oil or scum. As to design and strength, it is claimed that the new grating meets the Navy Military specifications and is being installed on Navy vessels. *Klemp Metal Grating Corporation, Dept. RTS, 6601 So. Melvina, Chicago 38.*



*No more kneeling with . . .*

## Foreman's sight car

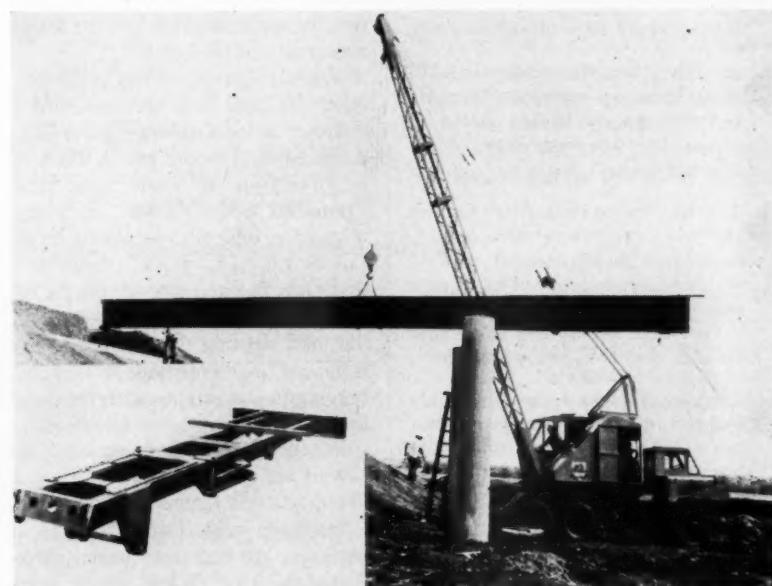
REPEATED stooping or kneeling of the foreman when sighting during raising or surfacing operations is eliminated through the use of a carrier unit called the Foreman's Sight Car. This unit permits the foreman to sight the rail from a prone position and, being self-propelled, enables him to travel along the rails without rising. *Kershaw Manufacturing Company, Inc., Dept. RTS, P.O. Box 510, Montgomery, Ala.*



*Extra reactive range for . . .*

## Double-coil washers

ENGINEERED especially for railroad frog and crossing application is a new double-coil spring washer designated Reliance Hy-Chrome Double Coil. With a reactive range of approximately 5/16in, these washers are said to exceed by 30 per cent the newly proposed AREA specification for 10,000-lb reactive pressure at 0.050 in release from the fourth application of a 60,000-lb. loading. This extra range and strength is said to be assurance that the high-chrome double coil spring washer will stay tight under the extreme stresses and vibration to which frogs and crossings are subjected. *Eaton Manufacturing Company, Reliance Division, Dept. RTS, Massillon, Ohio.*



*Greater capacity for . . .*

## Modified T-35 crane

A FULL 8-ton load, working at 10-ft radius over-end with outriggers, is now possible with the Bantam Model T-35 carrier-mounted crane. This is an increase of one ton in lifting capacity as compared with the former model and was achieved by making several modifications to the basic T-35 and the heavy-duty "300" crane carrier.

The following modifications have been incorporated into the new crane: New four-part hoist line and hook block; eight-part boom-support harness; new open-throat box boom top section; 1,250 lb of additional counterweight; hardened pins and bolts at highly stressed points in the boom and gantry assembly; double hook

rollers; heavy "A" frame legs and braces; high gantry; four extra bolts on the trunnion base; and flame-hardened rollers.

A new type box-beam frame has been incorporated in the "300" crane carriers for greater strength in the frame and maximum stability for handling big loads. The new box-beam frame is stress relieved to prevent warping and possible twisting. Additional features include pre-drilled, two-position mounting holes for 6-in and 26-in positions ahead of the bogie center; reinforced bumper for boom rack and magnet rack; and ears for rear bolt-on outriggers and brackets for center swinging outriggers are welded into position, reducing field fabrication requirements.

The Bantam "300" crane carrier offers six-wheel drive and is powered by a GMC 302-cu in gasoline engine. *Shield Bantam Company, Dept. RTS, Waverly, Iowa.*

# What's the answer?

## To be answered in October . . .

**Do you have an answer to any of the questions listed below? If so, send it in. Payment—based upon substance and length—will be made for each published answer. If you'd prefer that your name be withheld, we'll gladly comply.**

**DEADLINE: August 31**

- 1. What are the advantages, if any, in grinding the running surface of rail out-of-face? Under what conditions should such grinding be done? How often? Explain.
- 2. What are the advantages, if any, in using wrought iron tie spacer bars on bridge decks in place of outside wood guard rails? Disadvantages? Explain.
- 3. When laying continuous welded rail what are the relative advantages and disadvantages of field welds and conventional joints as a means of joining the long lengths? Where field welds are used how should they be made? Explain.
- 4. When constructing or resurfacing passenger platforms that are subject to heavy traffic from baggage and mail trucks what finishing methods or materials will produce a surface with the necessary wear-resistant qualities? Explain.
- 5. In cases where water supplies for railroad shop and terminal areas are obtained from municipal sources what equipment should a railroad provide to assure itself of an adequate supply of water, at the necessary pressure, for fire-protection purposes? Explain.

### Send answers to:

**What's the Answer Editor  
Railway Track & Structures  
79 West Monroe Street  
Chicago 3, Illinois**

**Do you have a question you'd like to have answered in these columns? If so, please send it in.**

## How many jacks required?

**When using hand jacks in connection with production tampers how many jacks are needed on each side to give the best results? Explain.**

### Make study beforehand

By T. L. BIGGAR  
Supervisor of Track  
Chesapeake & Ohio  
Covington, Ky.

The number of hand jacks needed in connection with production tampers varies with the amount of work that is to be done ahead of the tamper, the amount of lift and the length and condition of the rail.

When respacing of ties is not necessary and ties have been renewed in advance of the surfacing, fewer jacks are needed. I would say in this kind of operation at least eight jacks should be used on a side. It is very important that all low places in the rail be raised to grade; otherwise a first-class finished job will not be obtained. To obtain the desired grade, the men sighting the rail must have sufficient time and space to make all necessary corrections without delay to the tamper.

When ties are respaced and renewals are made in connection with the production tamper, it is necessary to use more jacks. Twelve to 16 jacks on a side are necessary in an operation of this kind. When ties are being renewed and respaced the jacks will settle to some extent and therefore must be reset or relocated to pull the rail to uniform grade. If too few jacks are used in this type operation, it will result in delay to the tamping machine.

The number of jacks used should always be kept to a minimum, especially in hot weather, when working under traffic. If rail is tight, the possibility of buckled track is much greater when several rail lengths are raised out of the old bed. Trains should never be allowed to pass over track that has been raised until all ties have been tamped. When too many jacks are used, this will result in un-

necessary delay in tamping runoffs.

In all cases, a study should be made before work starts to determine just what will be required to perform the desired volume of quality work with the least expense and delay to traffic.

### Need from 12 to 20

By L. ALLEN  
General Roadmaster  
Monon  
Lafayette, Ind.

It is presumed the question involves a smoothing operation rather than a new out-of-face ballasting operation. Our experience has been that sufficient track jacks are required to keep the newly raised track up to the proper level and for a sufficient distance in advance of a production tamper to let the rail level out. If there are any depressions which occur between the jacks ordinarily set approximately 16 ft apart, additional jacks should be set to bring up any "drooped" quarters so that these may be tamped with the tamper. Thereby there will be a minimum number of low spots in the finished track.

Usually about six track jacks are required on each rail for a total of 12 jacks when only a smoothing lift is being made and the track ties are straight across the track and properly spaced. However, if there is some spacing and straightening of ties to be done, the number of track jacks used would have to be increased to about 10 on each side for a total of 20, so as to permit a greater working distance in advance of the tamper for the number of men required to take care of the tie spacing and straightening. It has been found that when the ties are laying in good order, 12 jacks are adequate.

In some locations where a mini-

mum number of ties are to be renewed—possibly 60 to 100 to the mile—the spikes are pulled on the ties to be renewed prior to the jacking-up operation, and the old ties are pulled out immediately in advance of the tamper. These new ties are then machine-tamped in the surfacing operation, resulting in a uniformity of bearing on all ties within the track structure. Also, ties installed by this method can be placed at a minimum cost. Of course, this kind of an operation also requires the use of 16 to 20 track jacks. In other words, the distance from the tamper to the lead track jacks would be approximately 150 ft of track jacked up, thus providing distance for a sufficient number of men to work and have the track prepared and ready for the tamper as it approaches each tie to be tamped.

This experience has been based on the use of one tamper. If the machines are worked in tandem it might be found necessary to increase the number of track jacks used. Also, this experience was found wherein a smoothing operation is being carried and the track raise was not in excess of 2 in.

Where an operation is carried on

involving new out-of-face ballasting work where the track has been stripped and requires a lift of possibly 5 or 6 in, the requirement for track jacks would possibly be different. In such a case, no doubt, the track ties would be placed along with the stripping operation, and it would be necessary to keep the track lifted for possibly 100 ft in advance of the tamper so that the depressions could be closely watched and brought up with additional track jacks.

It is found that considerable economies can be realized over the above methods of using hand jacks with the use of power jacks.

#### Use 15 on each side

By G. W. BROWN  
Supervisor Track  
Pennsylvania R.R.  
Norristown, Pa.

When using hand jacks in connection with production tampers, it has been my experience that the use of 15 jacks on each side is sufficient to raise the track ahead of the tampers. This allows approximately 200 ft of

track to be raised to grade ahead of the tampers. In my opinion this is sufficient distance to obtain good surface and proper profile on the track.

In our heavy maintenance gangs, we use a Matisa Jack Carrier, which is a self-operated machine, to move the jacks from the tamping machine to the locations where the track is being raised. The use of this machine keeps the number of jacks needed to a minimum and also eliminates men necessary carrying jacks ahead.

The jacks are set at joints and centers. Usually about 11 or 12 jacks per side are set at one period of time with approximately 3 or 4 jacks per side in transit on the jack carrier. The force necessary to operate the jacks is 6 trackmen. Four men set and operate the jacks and, if necessary, make the jack holes ahead. The other two men are located at the tampers. They remove the jacks after the track is tamped and place them for movement by the jack carrier. They also observe the tamping operation, throw in ballast for the tamper and, if necessary, notify the operator of the machine that the tamper is not spotted right for the ties.

## Control of blow sand and soil

What is the most efficient method for controlling blow sand and soil? Of the methods currently in use, which has the lowest first cost, which the longest service life? To what extent does such work also contribute to the effective control of water erosion? Explain.

#### Conditions dictate method

By V. C. FOLEY  
Roadmaster  
Southern Pacific  
Yuma, Ariz.

Our biggest problem in this part of the country is sand. In fact we have not yet figured out a way to completely keep it off the track. The method to be used in trying to keep sand off the track varies, depending on the physical condition of the land, surrounding territories and equipment available.

Where conditions permit, I believe the best method to use in heavy blow sand territory is to build a dike and sand trap with a bulldozer on the windward side of track. The trap should be as deep and the dike as high as possible.

Where the prevailing winds blow at right angles across the track and from only one direction, this method is very efficient. However, in this part of the country, we have winds from both directions. Consequently, we use a combination of dikes and sand fence on both sides of the track.

The next best method in keeping sand off the track is to install fencing. In my opinion, the original cost of the fence is soon recovered. I have installed this type of fence at switches and other locations where we have excessive blow sand. The savings in labor of keeping switches clear during sandstorms soon paid for the fence.

By laying scrap ties on edge, end to end, at the edge of the toe path it is possible to keep soil from farm

lands from drifting onto the track and into switches. Ties must be close to the ground with no openings beneath them. This method is not very effective in heavy blow sand territory. Vegetation of any kind is quite effective.

Within one or two years, a sand fence must be removed and the sand pushed away with a dozer. If not, the wind will catch it in the opposite direction and take the fence down and the sand will blow away. At one location, I am now thinking about installing a second fence on top of the first one when it has reached its limit, and see what that does.

At some locations we are using oil applied to the subgrade toe path and in cuts. This makes a smooth surface and, in cuts, sand is soon whipped out by passing trains. Oiling also acts as a retarder against unwanted weed and vegetation growth as well as helping to stabilize fills and embankments.

At some locations where it is possible to obtain water, trees have been set out in single rows on top of sand dikes. I understand this is very ef-

fective, however, I have not had a chance to try this myself.

At some locations, blow sand conditions change from time to time. At other locations they remain more or less the same. We now have sand at some locations for the first time—due mostly to the development of irrigation systems where land is being cleared of vegetation and leveled, etc.

As for the most efficient and the longest lasting method of controlling blow sand, I believe the ditch and dike built by a dozer to be the best. If conditions will not permit, or if equipment is not available, I believe the snow fence the second best method. My thinking is that they both soon pay for their original cost of installation.

Sand, I have found, will reduce the life of crossties by half at least. It is necessary to remove many ties after they have been in service only seven years. Most ties will last 15 years in this sand territory, while in locations where practically no sand exists ties will last 28 and 30 years.

In the last few years we have been applying asphalt to that portion of ties under the tie plate when relaying new rail and also when installing new ties. Also, after back work is completed, we apply a coat of asphalt to the surface of the tie plate filling all spike holes and sealing the edges of the tie plates. The idea is to keep sand from between the plate and the tie to reduce plate-cut ties. I personally believe this to be very helpful.

It also quiets down the ride on the rear of trains.

After ballast becomes saturated with sand, track becomes rigid and rough riding. By looking at the surface of the rail, there does not seem to be any irregularity. However, if one gets off to one side and examines the tie plates, one will find one or two ties snug against the rail followed by any number of floating ties, then another tie snug against the rail, etc. These ties carry more than their share of the weight, and split and crush sooner than they would if the weight were evenly distributed. When removing such ties, there will be found as much as 1½ to 2 in of fine sand directly under the tie all the way across.

## Treated lumber in railway buildings

What factors determine whether the lumber used in railway buildings should be given preservative treatment? The type of treatment to be used? Explain.

### Treat all exposed lumber

By H. J. LIESER  
Supervisor Bridges & Buildings  
Chicago & Western Indiana  
Chicago

All lumber used in railroad buildings should be given preservative treatment when exposed to decay or attack by wood-destroying organisms.

Several of the most generally used preservatives in this area are coal tar, creosote, zinc chloride, chromated zinc chloride and Tanalite.

Creosote is used where odor is of no concern and painting is not required. Coal tar is sometimes added to creosote to reduce the cost, increase the resistance to water, and to retard the evaporation of the preservative.

Zinc chloride, chromated zinc chloride and Tanalite can be used if painting is required. These are not as permanent as creosote when the wood is in contact with water or excessive wetting.

Material should be air seasoned or, if time does not permit, artificial methods should be used, such as kiln drying or steaming. The length of time required to air dry wood for preservative treatment will vary in different climates, and on the kind, size and moisture content of the material.

If air seasoning is used the lumber should be treated before it begins to deteriorate.

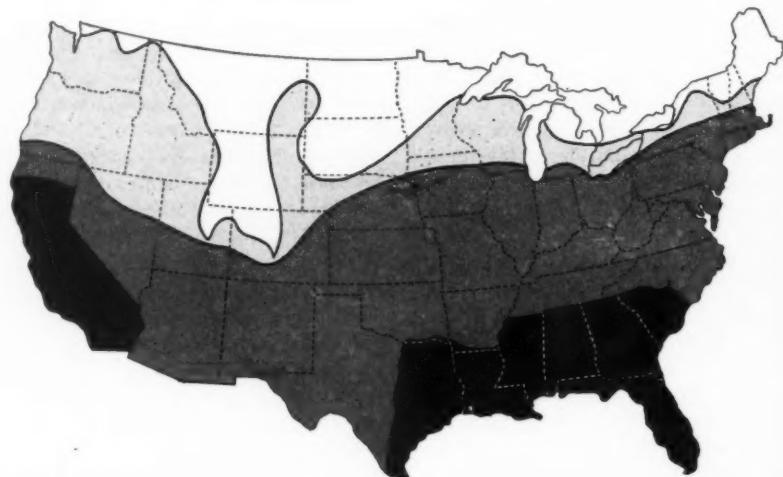
### Treat for permanence

By C. MILES BURPEE  
Executive Director  
American Wood Preservers' Institute  
Chicago

In any railroad building which is considered permanent, the building lumber should be given preservative

pressure treatment. The modest initial cost for pressure treatment would be far outweighed by labor costs of replacing untreated lumber that had deteriorated either from rot or insect attack. On all but temporary buildings, preservative treatment may be looked upon as insurance—low-cost insurance that may cost only one-sixth the cost of fire insurance when spread over a 30-year period. Railroads, as pioneers in wood preserving, are well aware of the advantages and economies of pressure-treated wood, and might well take the lead to extend its use to all vital wood structural members.

Climate is one important factor that governs the life of untreated wood and thus the need for wood pre-

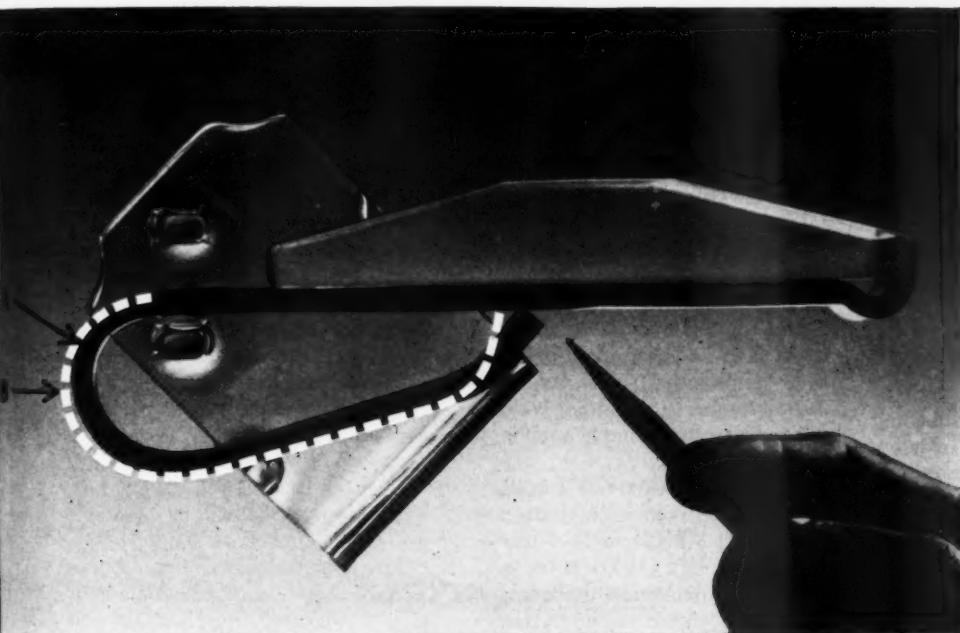
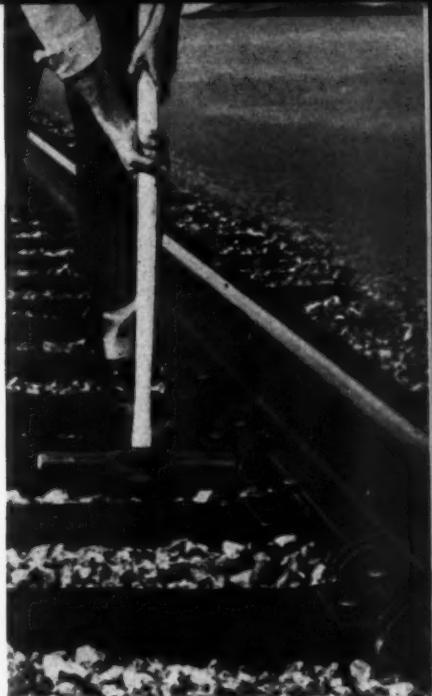


SOLID black indicates heavy incidence of termites, dark grey heavy to moderate, and light grey slight to moderate.

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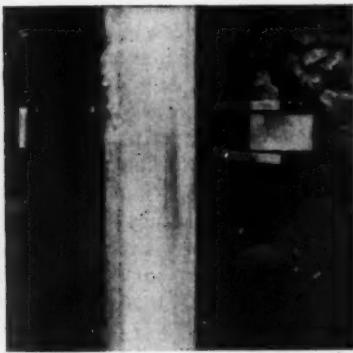
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## What's the Answer? (cont'd)

servation. Another is the type of building and the proximity of structural members to the ground or contact with masonry. In all the southern and West Coast states where warm temperatures and high humidities encourage decay and termites, it is foolhardy to rely on untreated substructural lumber for more than a few years of service. In the drywood termite zone along the California coast, the southern border, Gulf Coast, Florida, and the Atlantic coast as far north as Norfolk, Va., all of the structural lumber including roof decking should be pressure treated.

While less severe in other areas, termite attack is a growing problem in all but the northernmost states like Maine, Montana and the Dakotas (see map), while decay extends over the entire United States and well into Canada. The most severe decay damage occurs in the dark areas that are subject to the most severe termite attack.

Outside of the drywood termite zones, it would seem the part of discretion to avoid gambles on costly repairs by thorough protection of lumber for plates, sills, joists, beams, girders, subflooring, and furring strips on masonry foundations and walls—also for outdoor platforms, loading docks, steps, columns, and window frames near the ground. Where studs rest on sills or plates in contact with concrete, they also need this protection. If there are any conditions creating high humidity or condensation within the building, rafters and roof decking should be pressure treated.

Wood block flooring should be pressure treated. Timber foundation piles, when required, should also be pressure treated.

Adequate preservative treatment specifications for structural lumber and timber piles should provide for the use of standard preservatives and their application by standard processes to secure the required penetration, distribution, and retention to conform to Federal Specifications TT-W-571 and Standards C1, C2, C12 and C21 of the American Wood Preservers' Association.

The protection of building lumber is discussed more fully in a 24-page illustrated booklet, "How to Build

Homes that Will Outlive the Mortgage." It is based on a survey of 2,000 houses, some with preservative treated lumber and some without it. Pole-type construction is described and illustrated in another 74-page booklet, "Pressure Treated Timber Poles," featuring a section on design information and sources of building plans. Both of these books published by this institute are available to railroad men. Requests for both may be sent on company letterhead to Dept. RTS, American Wood Preservers' Institute, 111 W. Washington Street, Chicago 2, Ill.

taminated by the creosote fumes.

Buildings to be decorated and protected by painting do not require preservative treatment except in extreme cases of exposure to moisture or in highly infested termite territory. It is advisable, in such cases, to use salt-treated lumber as it is not practicable to paint creosote-treated lumber.

### Depends upon exposure

By L. P. DREW  
Assistant Chief Engineer  
Union Pacific  
Omaha, Neb.

The question as to whether preservative lumber should be used in the construction of railway structures depends first, on the type of structure, second, the purpose for which used, and third, the exposures to which the lumber is submitted.

As a general rule treated lumber should be used in all cases where the materials come in contact with the ground, humid atmosphere or other conditions which invite decay or infestation by insects or marine animals.

In addition to the above, consideration must be given to the occupancy of the building. First, if the structure is exposed to fire hazards a fire retardant preservative should be used. Second, if the occupancy is such that decay or disintegration of timber is invited by the usage of the building, a preservative treatment of some sort is in order.

For construction that is not subjected to any of the hazards enumerated above, and where the exposed lumber is to be painted for decorative or other reasons, preservative treatment is ordinarily not economical or necessary.

In areas where termite infestation is common and can be serious, all of the timbers and lumbers used in floors, sills and substructures should, by all means, be treated with a chemical solution that repels termite infestation.

In the case of structures which are exposed to sea water, salt solutions or strong alkalis and some of the acid chemicals, preservative treatment with one of the oil-borne solutions, such as creosote, creosote-petroleum or pentachlorophenol, is considered justified.



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# HARNISCHFEGER

Construction & Mining Division  
Milwaukee 46, Wisconsin

## What shape concrete piling?

What factors determine whether the cross section of precast concrete piles should be square, octagonal, round or some other shape? Explain.

### Octagonal best suited

By E. A. JOHNSON  
Engineer of Bridges  
Illinois Central  
Chicago

The individual's preference as to the shape of a pile section is a matter of personal opinion, cost, ease of

manufacture, handling, driving and appearance.

The square section requires a more elementary type of form which is easy to erect and remove. The ease in placing reinforcement and concrete is an advantage. For a given cross-sectional area, the square pile has a

greater surface area. It nests better in stacking and shipping. If the reinforcement is assembled in square cages, the added labor cost may offset other cost advantages. The rotation or out-of-line driving of a square pile is more noticeable in the finished structure and it is not as pleasing in appearance.

The octagonal section requires additional form work; but as the forms are usually constructed in sections for continuous re-use, this is not a serious handicap. Of course, the strutting and bracing of the forms cannot be completed until after the pre-assembled reinforcement has been placed. Inasmuch as spirals for the circular assembly of reinforcement can be purchased as a stock item, the labor cost of the field assembly is less than that for the square cage type of reinforcement. The octagonal piles stack readily for shipment and make a good appearance in the finished structure.

The round pile requires a different type of form work and method of casting than one having a cross-section made up of planes. This section is now being used to advantage in connection with the centrifugal casting of the large hollow piles.

It is my opinion that the octagonal pile is the best suited for most railroad bridge work.

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### No controlling factors

By R. I. SIMKINS  
Assistant Engineer of Bridges  
Atlantic Coast Line  
Wilmington, N. C.

In considering the best shape for precast concrete piles a number of factors may be considered, none of them controlling except possibly under special circumstances.

The square pile has the advantage of simpler forming than any other shape, and also greater bending strength for handling per unit of cross-section area, provided flat surfaces of the section are kept parallel and normal to the horizontal. The latter advantage could be important from a handling weight or an economic standpoint under some circumstances. While on the subject of strength, it must be said that the square pile does not lend itself to the use of spiral reinforcement as readily

as the other shapes, and according to some sources (notably AREA specifications), the spiral reinforcement gives greater column strength.

The octagonal pile is easily formed either with wooden forms or permanent metal forms, and spiral reinforcement can be readily used. The octagonal pile also has an advantage over the square pile in that, should the pile turn on its axis during driving, the result would not be as bad from an appearance standpoint.

The round pile has generally the same advantages and disadvantages as the octagonal pile, with the additional disadvantage that it is difficult to form, particularly if the forms are constructed of wood.

With due regard for all the factors stated above, the Atlantic Coast Line some years ago adopted the octagonal shape for 18- and 24-in precast piles.

Some prestressed piles of all shapes are now being cast with a cylindrical void space at the center. This reduces the amount of concrete and prestressing steel required. For economic comparison it would be cost of concrete and steel saved versus cost of providing void spaces. It appears that the principal advantage of hollow prestressed piles of 24-in diameter or less would be in weight reduction.

#### Several determining factors

By A. L. PIEPMEIER  
Assistant Chief Engineer  
Chicago Great Western  
Oelwein, Iowa

The first impression that one might have on this question is that it makes little difference what cross section is used, provided the section modulus is fairly equal on any axis. From the standpoint of forming or for special use the cross sectional type does enter into it.

Precast concrete piles used in a moderately low railroad trestle could as well be round, square or octagonal and would probably be satisfactory. The writer prefers in this case either the round or octagonal shape.

#### Findings of AREA

Committee 30 of the AREA has disclosed interesting findings in the lack of longitudinal forces in railroad bridges, and additional or more com-

plete tests may bring about a change in the design of bridge piers or bents. This may in turn lead to a change in the application or even the cross section of piling.

The square or rectangular sections lend themselves better to forming and casting especially when casting is done on the job with limited facilities.

#### Lists Nine Factors

The factors determining the section of a piling could possibly be listed as follows:

(1) The application to which the pile is to be used. For instance, if the pile is subjected to moment about one axis the rectangular pile might be more practical or economical.

(2) The availability of forms: If metal or reusable forms are used, the shape of the pile is not too important.

(3) The number of piles to be cast. If forms are designed to facilitate speed in casting, piling of any reasonable shape can be cast quite economically.

(4) The type and control of con-

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## What's the answer (cont'd)

crete and aggregate. Large aggregate does not fit in properly around close reinforcing steel or in close sections of the forms.

(5) The loading on the pile. Large loads require larger piling and loads tend to be carried by the piling in the vicinity of the reinforcing steel. A square section pile with spiral reinforcing would tend to carry the stress in the vicinity of the core and the corners would be less effective.

(6) The elements to which the pile is to be subjected. Salt water or severe freezing and thawing cycles will require more cover over the reinforcing steel and in some cases will require a larger pile to provide this cover.

(7) The method of handling or equipment available for handling or driving. Care must be used in picking up piles to avoid cracking. Larger piles sometimes do not fit in the driver leads or hammer; therefore, this is an important factor in selecting the size and shape.

(8) The frequency of having to splice piling. Here again it is important to consider forms available for this and the method to be used in splicing.

(9) Appearance. The looks of the structure can be an important factor. With proper consideration a neat looking structure can be obtained without adding materially to the cost or sacrificing strength. The hexagonal or octagonal piles have a very pleasing appearance.

Cast-in-place piling have been used quite successfully and should lend themselves quite well to work in the future with the increased manufacture of various tubes and pipes. The cross section of the tube would, of course, determine the concrete section but this can be modified by adding a reinforcing "cage" or even an additional tube inside for lightness or possible drains or conduit.

More important than the shape of the piling is the size, concrete control, reinforcing location and length. Any reasonable shape can be used to good advantage in most structures.

## Octagonal and Square Economical

By H. E. RAVER  
Engineer Structures & Design  
Long Island  
Jamaica, N. Y.

Precast concrete piles are designed to support vertical loads in foundations and in trestles or similar structure to carry lateral as well as vertical loads.

The most economical and thereby the most common shapes are octagonal and square. Octagonal piles have the same strength in flexure in all directions. They are more attractive when exposed and any minor rotation while driving does not affect the strength or appearance. The edges are not sharp enough to require chamfering as in square piles. They are adaptable to handling and storing. The octagonal pile is predominately used for trestles, high station platforms and many other structures where the piles will be exposed or are point bearing and acting as a column.

The square pile has certain advantages. It is easier to cast and handle. The reinforcing bars are better located for resisting flexure. For the same sectional area you get greater perimeter or surface area and this is important if the piles are the friction type. Where use permits it is more economical than the octagonal shape.

Due to various methods required in manufacturing, the round pile is more expensive than the octagonal and square pile.

As the length is a big factor in deciding the size and shape, a careful study of reliable boring data is necessary. A sound method for determining the length of pile is to apply the boring data as prescribed in the AREA Manual, Chapter 8, Part 5, Section B and Article 5. The distance between the desired load-bearing strata and pile cut off, plus 5 ft, should be a safe ordering length. With the length established, the size and shape may be determined by applying the balance of the boring data in the design.



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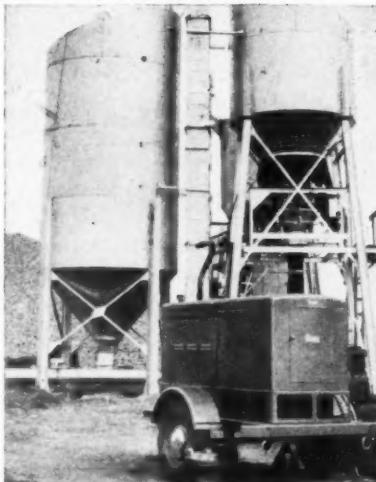
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## News about people

(Continued from page 30)

of the **Ralph W. Payne Company**, Washington, D. C. has joined **James B. Akers** in forming this new firm representing manufacturers with offices at 2304 Wilson Blvd., Arlington 1, Va.

**TRUE TEMPER CORPORATION** — **J. H. Dooling** has been appointed New England representative for the Railway Appliance Division, according to **R. J. Whalen**, sales manager of the division. Mr. Dooling will have headquarters in Fitchburg, Mass. His appointment was effective June 15, 1957.

## Biographical briefs

**W. E. Chapman**, 57, who was recently named chief engineer—maintenance of the Central of Georgia at Savannah, Ga. (*RT&S*, April, p. 66), graduated from Alabama Polytechnic Institute and joined the CofGa in February 1925 as a draftsman. He served successively as assistant engineer, assistant supervisor, supervisor, and division engineer until January 15, 1953, when he was named engineer maintenance of way at Savannah. On May 1, 1955, he was promoted to engineer maintenance of way and valuation and, on August 1 of the same year, was appointed superintendent of maintenance—the position he held at the time of his promotion.

**Jennings B. McKerley**, 51, who was recently named chief engineer of the Central of Georgia at Savannah, Ga. (*RT&S*, April, p. 66), graduated from Clemson College and joined the CofGa in April 1927 as a draftsman at Savannah. He served successively as assistant engineer, road supervisor, bridge and building supervisor, division engineer, and assistant chief engineer until August 1, 1955, when he was named acting chief engineer at Savannah—the position he held at the time of his recent promotion.

**George W. Benson**, 59, who was recently named superintendent of structures and materials on the Central of Georgia at Macon, Ga. (*RT&S*, April, p. 78), graduated from the University of Kentucky and joined the CofGa as a draftsman in the office of the chief engineer at Savannah in 1922. He served subsequently as assistant engineer, locating engineer, resi-



J. B. McKerley



W. E. Chapman  
(Central of Georgia)

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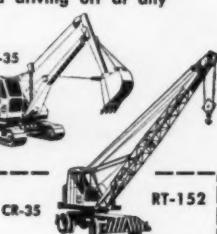
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C-35

RT-152

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## Biographical Briefs (cont'd)

dent engineer, assistant supervisor of track, track supervisor, assistant engineer, track supervisor, and supervisor of bridges and buildings until November 1946 when he was promoted to structural engineer at Savannah. In June 1947, he was named superintendent of bridges at Macon—the position he was holding at the time of his recent promotion.

**James C. Waldrop**, 40, recently named process superintendent—track on the Central of Georgia at Macon, Ga. (*RT&S*, April, p. 78), graduated from Gordon Military College and joined the CofGa in August 1939 as an extra gang laborer. After working as relief extra gang and section foreman, he was promoted to apprentice track supervisor in December 1955 and to track supervisor on August 1, 1956—the position he held at the time of his promotion.

**E. E. Crowley**, 67, who recently retired as division engineer of the Delaware & Hudson at Albany, N. Y. (*RT&S*, April, p. 56), entered railroad service with the Chicago & North Western in 1908 as a timekeeper. He worked successively as extra gang foreman and assistant roadmaster until September 1918, when he joined the Frisco as a roadmaster. He joined the D&H in 1918, serving as roadmaster and, since May 1952, as division engineer at Albany.

## BACK-OF-THE-BOOK =

### Briefs

#### "Atomic" switch lamp being tested by several railroads

The development of a radio-active source of illumination for switch lamps has been the subject of considerable research on the Denver & Rio Grande Western, working in cooperation with the United States Radium Corporation. It is visualized that such a light source, if it proves practical, could also be used for markers, lanterns, lights in tunnels, dial illumination and the marking of objects located in extremely dark areas.

The "atomic" switch lamp, according to Ray McBriar, director of research, D&RGW, utilizes a krypton isotope gas which reacts with phosphorous to produce a self-luminous glow. The krypton, according to Mr. McBriar, has a half-life of approximately 10 years, requiring no maintenance or fuel. He points out that the unit can be restored at any time to full luminous power by refilling it with a krypton isotope gas. The gas is inert and the lamp can be used with safety, he says. However, Mr. McBriar goes on to point out that the use of such lamps must be licensed by the Atomic Energy Commission.

The United States Radium Corporation reports that extensive field testing of a switch lamp incorporating radioisotope-activated light sources is now underway. Major attention at this time is being given to the improvement of the light source itself. As yet, the company has devoted little effort to the design of a switch-lamp type housing for the light source.

For field test purposes, the radio-active light sources are being installed in switch lamp housings which are currently available to the railroads to establish suppliers.

In addition to the D&RGW, the New York Central, the Pennsylvania and the Chicago, Burlington & Quincy have purchased experimental radio-active switch lamps for field testing. The U. S. Radium Corporation expects that, if specifications are set by the railroads for a radio-active light source for switch lamps, it will undertake the development of a complete lamp structure.

#### In Case of Enemy Attack

Railroads and highways would be less susceptible to serious damage from enemy attack than industry, according to a report on "Reducing Our Vulnerability to Attack," recently made public by the Office of Defense Mobilization.

The report pointed out that the United States "lives under the threat of massive,

(Continued on page 66)

## SIMPLEX JACKS

First Choice for Railroad Use!



#### POLE PULLING AND STRAIGHTENING JACKS

5 and 15 ton models for all pole sizes. Base pivots. Also can be used for guy wire tightening and pulling underground cables.



#### TRACK JACKS (Trip Type)

Malleable or aluminum housings. Large grooved toe areas. Trip on both sides. 12 models.



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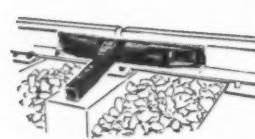
Capacities of 3-100 tons. 8 models. Also self-contained and remote controlled hydraulic rams and pullers.

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RE-MO-TROL UTH-A-TOOL JENNY BOL-TOE



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Permit crossing and switch lining, rail spreading and pulling without service interruption.

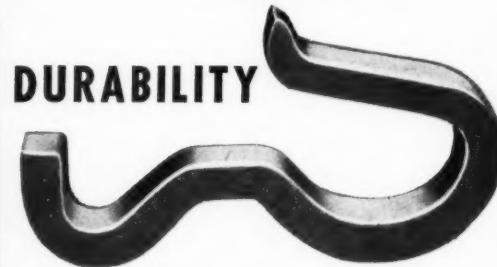
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The poured concrete floor of the tunnel is approximately 10 feet below the tracks.

## Safe Underpass for Southern Pacific Workers Installed with No Interruption to Traffic

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An elliptical-shaped tunnel of Armco Liner Plates takes them underground from a bus stop on one edge of the yard to locker rooms. The well-lighted, 262-foot-long, 94-inch-diameter structure goes under 15 tracks. Tunneling operations were carried on without interrupting Southern Pacific rail service.

With lightweight Armco Liner Plates, one man can carry, hold and bolt a section into place. All assembly is done from inside.

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## ARMCO LINER PLATES

RAILWAY TRACK and STRUCTURES



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## Back-of-the-book-briefs (cont'd)

crippling attack," and that Russia "has the weapons and has the means to deliver them." As to the possible effect of an attack on transportation, the report said:

"Surface transportation, as a whole, including the railroads and highways connecting cities, is of relatively low vulnerability to attack. Motive power, freight cars and highway vehicles tend to be more dispersed than most industrial target systems. Hence, transportation capacity is not likely to be lost as rapidly as the industrial capacity which generates traffic."

The big problem, insofar as transportation is concerned, is the protection of personnel, according to the report. It explains the problem this way:

"Although a great part of the transportation system is relatively invulnerable to blast and thermo affects, the widespread fallout, which is to be expected suggests that a shortage of experienced personnel will prove the most serious obstacle to the restoration of transportation services, since these personnel will tend to be lost in much larger proportion than the physical facilities. Therefore, much emphasis must be placed on the protection of personnel and upon its use following an attack situation."



Filling potholes in a steel highway. Worn crossing being rebuilt with Manganweld.  
Takes 40 million tons of traffic yearly.

## CROSSINGS TAKE THE POUNDING BETTER when hardsurfaced with MANGANWELD

Maintenance-of-way departments prefer Manganweld hardsurfacing for frogs and crossings. That's because Manganweld is tough—stands up better under hammer blows of heavy traffic. Fast, easy application reduces maintenance time and costs.

**Lincoln Manganweld Hardsurfacing Electrode** contains 11% to 14% manganese. Available in three types: A is a shielded arc, extruded coating electrode, B is tube type having no coating, C is bare, solid wire. Approved by A.R.E.A. Write for Bulletin SB-1352.

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**THE LINCOLN ELECTRIC COMPANY**  
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*The World's Largest Manufacturer of Arc Welding Equipment*

## Association News

### Roadmasters' Association

The Executive Committee of the Association will hold a meeting at the Chicago Engineers' Club on Monday, July 15. The purpose of the meeting will be to make final plans for the annual convention, to be held at the Conrad Hilton Hotel, Chicago, September 23-25. Routine business will also be transacted.

### Bridge & Building Association

The Executive Committee of the Association held a meeting at the Chicago Engineers' Club on Monday, June 24. This was the last meeting to be held prior to the annual meeting, which will take place on September 23-25 at the Conrad Hilton Hotel, Chicago. At its meeting the Executive Committee reviewed all the technical committee reports to be presented at the convention, and also discussed final details of the convention program.

### Helps from manufacturers

The following compilation of literature—including pamphlets and data sheets—is offered free to railroad men by manufacturers to the railroad industry. To receive the desired information, write direct to the manufacturer.

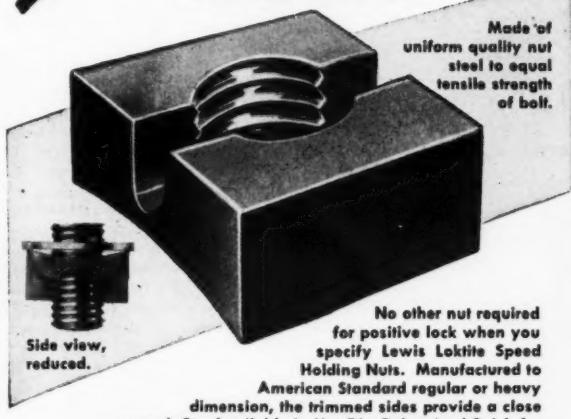
**TRUCK CONVERTORS.** Principles of the hydraulic torque convertor drive which the manufacturer began using in its crawler tractors in 1940, are outlined in a new piece of literature (MS-1233) now available. (Write: Construction Machinery Division, Allis-Chalmers Manufacturing Company, Dept. RTS, Milwaukee, Wis.)

**WELDING ELECTRODES.** A 20-page booklet describing Murex Hardex hard-surfacing electrodes is now available. The electrodes best suited to hundreds of different hard surfacing applications are charted in the booklet. Information is also furnished on how to decrease porosity, cracking, penetration and weld metal dilution with low hydrogen electrodes. (Write: Metal & Thermit Corporation, Dept. RTS, Rahway, N. J.)

**DIESEL PILE HAMMERS.** A new bulletin describes the manufacturer's Models DE-20 and DE-30 diesel pile hammers. The bulletin, "67R" describes the firm's complete line of universal drive caps developed specifically for use with the new diesel pile hammers. Contents include details of the operational features and describes the complete cycle of operation. A chart graphs the solution of a formula to determine the static load-bearing capacity for both sizes of the hammers when delivering observed blows per inch with observed ram-piston strokes. (Write: Pile Hammer Division, Dept. RTS, McKinnan-Terry Corporation, Dover, N. J.)

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*Lewis* **LOKTITE  
NUTS**



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reduced.

No other nut required  
for positive lock when you  
specify Lewis LOKTITE Speed  
Holding Nuts. Manufactured to  
American Standard regular or heavy  
dimension, the trimmed sides provide a close  
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Double-Life, greater economy, in black for low original cost.  
Call, wire or write for samples, prices.

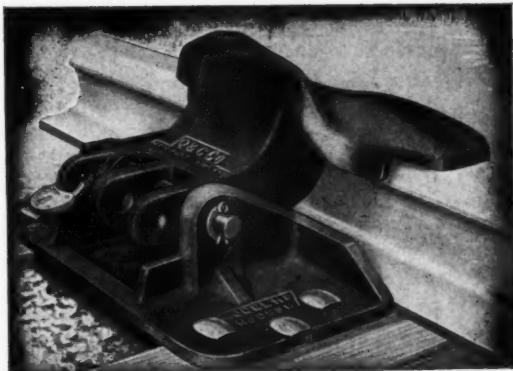
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Q and C Hand Throw Derails are of simple design, durable and effective. They may be adjusted in the brackets to fit a range of rail sections, eliminating the necessity of carrying many sizes in stock, thus reducing inventories.

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Our 71st year in the development of worthwhile track appliances

**Wisconsin-Powered Wrench  
Cuts Track Bolting Time;  
Adjusts To Proper Tension**



CHICAGO, ILL.—Rail bolt installation and removal time is cut to a minimum with the Matisa POWER WRENCH, distributed by the Matisa Equipment Corporation, Chicago, Ill. This portable wrench is capable of horizontal and vertical bolting, and features an adjustable spring-loaded disc clutch for applying a predetermined and constant torque to equalize track bolt tension. It features light, sturdy construction for heavy-duty operation, the company says.

A Wisconsin air-cooled, single-cylinder engine powers the Matisa POWER WRENCH... further proof that more Wisconsin engines are specified to power maintenance-of-way equipment than any other make! The list includes rail grinders, tie removers, ballast and multiple tampers, tie cutters, track brooms, rail cutters, track jacks, spike pullers, oil spray cars, weed cutters, to name a few! Why this preference? Here's HEAVY-DUTY stamina combined with unmatched HIGH TORQUE for load-holding lugging power to give maintenance-of-way users most hp. hours!

A copy of our "Spec" bulletin S-212 with full information on all models is yours for the asking.

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JULY, 1957 67

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**WOOLERY WEED BURNER** trailer type (shown above) can be towed by motor car. Three burners clear a swath 15 feet wide on first trip and if required can be widened to 25 feet with burners extended on second trip.

A great many millions of dollars have been spent keeping road-beds clear of weeds—and also for keeping retarders and switches open in the winter.

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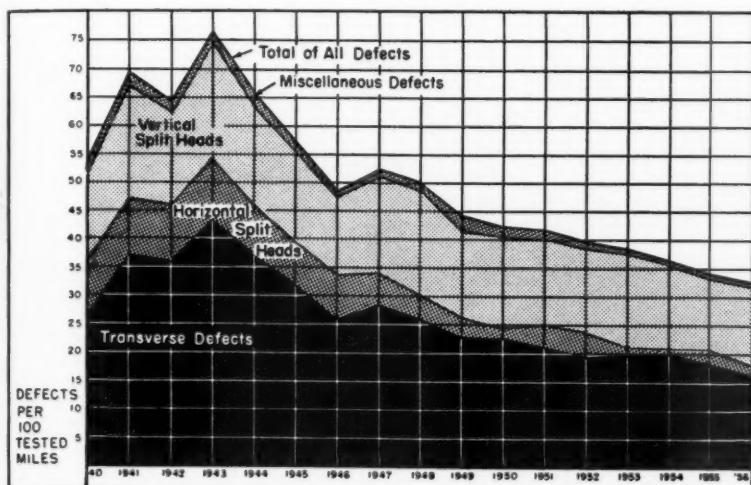
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Present loads and speeds on American rails introduce changing problems in detecting rail defects. Defective rails per hundred miles have shown a gradual decline since 1947, as the chart illustrates. A most important factor responsible for this decline is the increase each year of CC rail mileage tested. However, we are detecting an increasing number of detail fractures which tend to fail at smaller size. In fact, these account for 42% of all defects now found in CC rail. Keeping ahead of such situations is a research function to which Sperry devotes an impressive amount of time, money and experience.



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Every piece of detection equipment in Sperry Rail Cars has been designed and tested first in "our own back yard," on a test track containing every known type of defect. If it performs satisfactorily, it is then placed on an operational car for actual field testing. When an improvement passes field testing, it is then placed on the entire detector car fleet.



Today, Sperry offers the railroad industry a complete range of modern inspection instruments and techniques for testing rails in track. Through constant research and development it will be even more complete tomorrow.

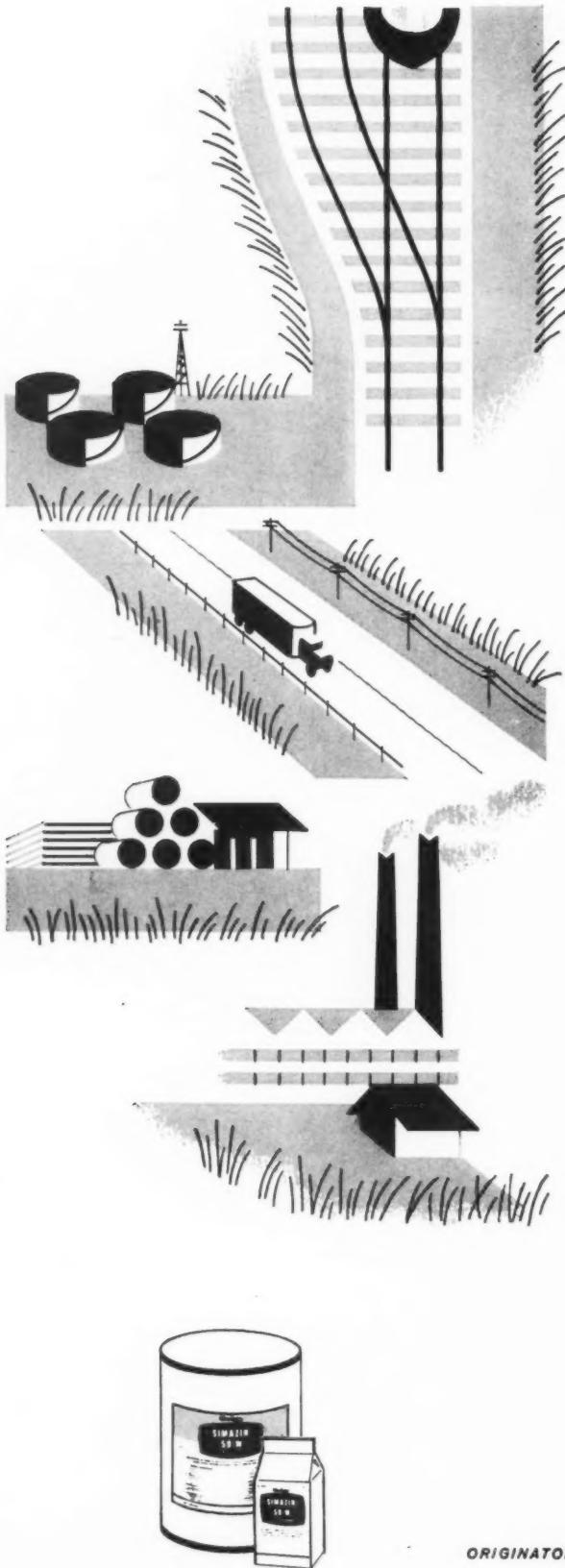


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# SIMAZIN<sup>\*</sup> 50W

*a new pre-emergence herbicide*

**Now available for long residual control of grass and broadleaf weeds in driveways, roadways, railroads, walks, paths, industrial sites, around buildings and other non-cropped areas.**

NOW YOU CAN STOP WEEDS BEFORE THEY START with Geigy's amazing new pre-emergence herbicide Simazin 50W. This is what preventive weed control with Simazin 50W can mean in terms of time and money saved for industries, municipalities, highway commissions, railroads, utilities and any other business or service concerned with the problem of weed control on non-cropped areas.

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Simazin 50W, a triazine compound, is not a contact or foliage herbicide, but acts on the plant roots, and should be applied just before germination or emergence for best results. Before using Simazin 50W for long residual weed control, existing plant growth should first be removed by use of a contact herbicide, or by mowing or ploughing under.

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One pre-emergence application of Simazin 50W applied at the rate of 10 lbs. per acre controls most grassy and broadleaf weeds for about a year. The material is economical and easy to use. At the maximum rate of application, less than  $\frac{1}{2}$  lb. is required to treat 1,000 sq. ft.

#### **Controls a Variety of Weeds**

Simazin 50W controls a wide variety of grasses and broadleaf weeds including barnyard grass, witch grass, yellow foxtail, wild oats, crabgrass, broadleaf plantain, dandelion, lamb's quarter, pigweed, ragweed, nightshade, purslane, velvetleaf and mustard.

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Simazin 50W has very low toxicity to humans and domestic animals. It is non-corrosive and can be removed from spraying equipment by merely flushing thoroughly with water.

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Since there is practically no lateral leaching, Simazin 50W can be used adjacent to crop land and ornamental areas. Lack of phytotoxicity to foliage minimizes drift hazard.

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Geigy Simazin 50W, containing 50% active ingredient is available in cases of 10 x 5 lb. bags and 50 lb. fiber drums.

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